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AUTHOR Law, Song Seng
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ABSTRACT

The history of technical and vocational education in Singapore goes back only to the mid-1960s, when it received attention in response to the policies of industrialization adopted when Singapore became an independent republic. Establishment of the Industrial Training Board (ITB) in 1973 was the first significant step toward formalizing vocational training outside the school system. The ITB merged with the Adult Education Board in 1979 to form the Vocational and Industrial Training Board, which was recently restructured and replaced by the Institute of Technical Education (ITE). The main training programs of the ITE are full-time, preemployment institutional training for school leavers, part-time continuing education and training for workers, and apprenticeship and industry-based training. A system of establishing skills standards and curriculum development has been established to ensure that courses are relevant and meet industry requirements. To evaluate program performance, ITE conducts surveys of employers, course evaluation, and employment experiences on a regular basis. A Feature Analysis Model is used to assess effectiveness of individual courses. New plans and strategies to upgrade the vocational and technical training system have been recommended and there will be renewed emphasis on apprenticeship and intensified efforts to promote continuing education and training. (Appendixes include organizational charts, course lists, data charts, and 10 references.) (YLB)

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Institute of Technical Education

STUDY ON

OVERVIEW OF VOCATIONAL TRAINING PROGRAMMES

SINGAPORE

External Collaborator:

Dr Law Song Seng
Director & Chief Executive Officer
Institute of Technical Education
Singapore

U.S. DEPARTMENT OF EDUCATION
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(1) A study conducted under iLO external collaboration contract for APSDEP.

(2) ITE replaces the former Vocational Industrial Training Board as of 1 April 1992.

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STUDY ON OVERVIEW OF VOCATIONAL TRAINING PROGRAMMES - SINGAPORE

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EXECUTIVE SUMMARY

Introduction

1 This paper provides an overview of the vocational training system in Singapore and the experiences encountered in its development and implementation. The following aspects are discussed:

1.1 The vocational training system and programmes;

1.2 The effectiveness of the programmes in meeting the objectives of training;

1.3 The need and plans to upgrade vocational training; and

1.4 Conclusions.

Development of Vocational Training

2 It was only in the mid 1960s that special attention was given to technical and vocational training in view of new policies on industrialisation when Singapore became an independent Republic. Over the past two and a half decades, the system of training has evolved in response to educational, economic and technological changes in keeping with the continuing progress and development of the country.

3 In the beginning, vocational training was provided within the school system and administered by the Technical Education Department of the Ministry of Education. The first significant step towards establishing a separate body to centralise, coordinate and intensify industrial training took place in 1973 with the setting up of the Industrial Training Board (ITB). ITB marks the formalization of a vocational training outside the school system.

4 To further improve and consolidate the vocational training system, the ITB was merged with the Adult Education Board in 1979 to form the former Vocational and Industrial Training Board (VITB) as a single national authority to promote, develop and provide vocational training. The VITB was recently restructured and replaced by the Institute of Technical Education on 1 Apr 92 as a post-secondary training institution.

The Institute of Technical Education (ITE)

5 The mission of ITE is "to maximise the human potential of Singaporeans through excellence in technical education and training so as to develop the quality of our workforce and enhance Singapore's global competitiveness".

6 The main training programmes of ITE are as follows:

6.1 Full-time pre-employment institutional training for school leavers;

6.2 Part-time continuing education and training for workers; and

6.3 Apprenticeship and industry-based training.

Full-Time Pre-Employment Institutional training

7 Full-time institutional training is the main feature of the vocational training system in Singapore. A range of 43 courses are provided through a system of 10 ITE institutes in engineering, business studies and technical skills. Under the existing system, Basic Vocational Training and National Technical Certificate Grade 3 courses cater largely to the primary school leavers, while courses under the Industrial Technician Certificate, National Technical Certificate Grade 2, Certificate in Office Skills and Certificate in Business Studies are for secondary school leavers. The intake and enrolment for full-time courses in 1990 were 9,200 and 16,000 respectively.

Continuing Education and Training (CET) for Workers

8 An extensive programme of CET has been established for workers. Many full-time skills courses are also offered on a part-time basis to meet the needs of working adults. The National Technical Certificate courses are offered as self-contained training modules leading to employable skills under the Modular Skills Training (MOST) scheme. Part-time academic education programmes are available to those who wish to upgrade their education levels. In

addition, ITE administers two national worker education programmes, namely Basic Education for Skills Training (BEST) and Worker Improvement through Secondary Education (WISE), in English Language and Mathematics to provide the educational foundation for further skills training. More recently, the TIME (Training Initiative for Mature Employees) Programme was introduced for workers aged 40 and above who need to retrain or upgrade their skills. The intake into the CET programmes in 1990 exceeded 90,000 training places.

Apprenticeship and Industry-based Training

9 Besides full-time institutional training, another viable approach to training young persons is through apprenticeship and industry-based training. As illustrated by the 'dual' system of Germany and On-the-Job Training in Japan, these models have proven to be effective in preparing a quality workforce.

10 In line with this philosophy, the ITE has been supporting the efforts of employers in the training of workers in two ways :

10.1 By promoting and supporting apprenticeship training; and

10.2 By helping employers to set up in-house training courses through the Approved Training Centre (ATC) scheme.

11 The apprenticeship system was recently reviewed. A New Apprenticeship System (NAS) was launched in 1990 to expand the scope and upgrade the quality of apprenticeship training in Singapore. The new focus on the apprenticeship model is viewed as an important strategy to further strengthen the vocational training system. Presently, there are 2,700 apprentices undergoing training in over 300 companies.

Skill Standards and Certification

12 A system of establishing skills standards and curriculum development has been established to ensure that the courses are relevant and meet the requirements of industry. The process incorporates features like the DACUM method of occupational analysis, occupational classifications and skills standards. The training standards and certification are endorsed through a system of Training Advisory Committees comprising professionals from the industries.

13 Currently, ITE certifies skills under 5 categories. These are the Industrial Technician Certificate, Certificate in Business Studies and Certificate in Office Skills, National Technical Certificate Grade 1 to 3 (NTC-1 to NTC-3), Certificate of Competency and Certificate of Service Skills. Besides certification through the formal institutional training, a Public Trade Testing system allows workers who may not have formal training but with relevant work experience to be tested and certified under the National Technical Certificate system. In 1990, about 58,000 candidates were tested under the various types of certification.

Effectiveness of Training

14 To evaluate the performance of its programmes, surveys of employers, course evaluation and employment experiences of graduates are carried out on a regular basis. The effectiveness of individual courses are also assessed through a Feature Analysis Model. The model has 13 performance indicators to assess and systematically rank the overall performance of the various courses.

15 Singapore's experience shows that secondary school leavers who take up technical training are able to complete their courses successfully and secure jobs in areas for which they are trained. Generally, they are paid good salaries and have good career prospects. On the other hand, this positive experience is not shared by primary school leavers who enrol in vocational training. Many are unable to complete their training because of lack of competencies in English Language and Mathematics. Moreover, in view of the changes in the work environment, employers need vocational graduates with a secondary education.

Plans to Upgrade Vocational Training

16 In 1990, a review by the Ministry of Education on primary education resulted in two recommendations which have direct implications on vocational training. These are that :

16.1 All pupils will receive at least 10 years of general education, including secondary education, before they proceed to further education and training; and

16.2 A new secondary level (Technical) course will be introduced for pupils who are not academically inclined to better orientate and prepare them for vocational training.

17 In response to these changes, the vocational training system was also reviewed resulting in four major plans to upgrade vocational training in Singapore. These plans are :

17.1 Upgrading VITB to a post-secondary institution;

17.2 Expanding scope of apprenticeship training;

17.3 Progression opportunities; and

17.4 Upgrading training environment.

Conclusions

18 Vocational training is dynamic. In Singapore, the training system has undergone significant changes in its relatively short history. The upgrading process is necessary if the system is to stay relevant in the light of changes in education, technology, economy and aspirations of school leavers and working adults.

19 Two major reviews on education and vocational training in 1990 have led to fundamental changes and a restructuring of vocational training. The basic philosophy is that all pupils will receive at least 10 years of general education, including secondary education, before they proceed for further education and training.

20 A new organisation, the Institute of Technical Education (ITE) has just been established, taking over the functions of the former Vocational & Industrial Training Board (VITB). As a post-secondary institution, the new ITE will be better positioned to meet the needs of school leavers, working adults and the economy.

21 New plans and strategies have been formulated to further upgrade the vocational and technical training system in Singapore. There will be renewed emphasis on apprenticeship and intensified efforts to promote continuing education and training. Many challenges lie ahead. There are also new opportunities.

List of Abbreviations

ATC	Approved Training Centre
BEST	Basic Education For Skills Training
BVT	Basic Vocational Training
CBS	Certificate in Business Studies
CET	Continuing Education & Training
CIDB	Construction Industry Development Board
CoC	Certificate of Competency
COS	Certificate in Office Skills
EDB	Economic Development Board
GCE	General Certificate of Education
ITC	Industrial Technician Certificate
ITB	Industrial Training Board
ITE	Institute of Technical Education
MOST	Modular Skills Training
MTI	Ministry of Trade and Industry
NAS	New Apprenticeship System
NTC-1	National Technical Certificate Grade 1
NTC-2	National Technical Certificate Grade 2
NTC-3	National Technical Certificate Grade 3
NTUC	National Trades Union Congress
PSLE	Primary School Leaving Examination
PSPE	Primary School Proficiency Examination
PTT	Public Trade Testing
SDF	Skills Development Fund
SHATEC	Singapore Hotel Association Training & Education Centre

TAC	Training Advisory Committee
TIME	Training Initiative For Mature Employees
TCC	Technical Certification Committee
VITB	Vocational & Industrial Training Board
WISE	Worker Improvement Through Secondary Education

I - INTRODUCTION

Background

1 This paper provides an overview of the vocational training system in Singapore and the experiences encountered in its development and implementation. It will be presented in a Sub-Regional Seminar on Vocational Training Policy & Programmes to be organised by the Asian and Pacific Skill Development Programme (APSDEP) in Indonesia.

Objective of Paper

2 The objective of this paper is to discuss:

2.1 The vocational training system and programmes in Singapore;

2.2 The effectiveness of the programmes in meeting the objectives of training technical manpower needed by the economy; and

2.3 The need and plans to upgrade vocational training.

Methodology

3 The paper is based mainly on secondary research done on existing materials on education and vocational training listed in the Selected Bibliography. The statistics, where appropriate, will show trends in the development of vocational training for the period 1980 to 1990.

II - THE EDUCATION SYSTEM

4 The present education system was introduced in 1980 and is directed towards serving the nation's manpower development objectives and aimed at maximising the potential of each person to the fullest.

5 The system which emphasises bilingualism (ie English and the mother tongue) consists of 4 levels, commencing at the primary level to the secondary, post secondary and university levels.

Primary Level

6 All primary school pupils go through a 3-year common course where they study English language, the mother tongue and mathematics. At the end of Primary 3, the pupils are streamed to the Normal Bilingual (N) course, the Extended Bilingual (E) course, or the Monolingual (M) course. Pupils in the N and E courses sit for the Primary School Leaving Examination (PSLE) after further 3 and 5 years of primary school respectively. M course pupils sit for the Primary School Proficiency Examination (PSPE) after a further 5 years and are awarded a certificate. They can then proceed to the Institute of Technical Education (ITE) to undertake basic vocational training.

Secondary level

7 Based on the PSLE results, primary school pupils are streamed to the 4-year Special (S), the 4-year Express (E) or the 5-year Normal (N) course. At the end of the fourth year, the S and E pupils sit for the General Certificate of Education (GCE) 'O' Level examinations, while the N pupils sit for the GCE 'N' Level examinations. GCE 'N' holders with good results can stay on for another year and sit for the GCE 'O' Level examinations at the end of the fifth year of their secondary school.

Post-Secondary level

8 Successful GCE 'O' Level candidates may proceed to pre-university education which comprise a 2-year course in Junior Colleges or a 3-year course in Pre-University Centres which leads to the GCE 'A' Level examinations. Alternatively, they may enrol for technical or commercial training courses offered by the Polytechnics, ITE technical institutes or Economic Development Board (EDB) training centres.

Tertiary level

9 Persons who are successful in the GCE 'A' Level examinations and those who excel in their polytechnics courses may proceed to undertake degree courses in the 2 universities, namely National University of Singapore and Nanyang Technological University.

10 The linkages among the different levels of the education and training system are illustrated at Annex 1. The system provides opportunities for persons with different capabilities to progress to the highest level according to their abilities and aptitudes.

III - DEVELOPMENT OF VOCATIONAL TRAINING

Historical Perspective

11 Formal vocational training in Singapore has a relatively short history. It was only in the mid-1960s that attention was given to technical and vocational education in response to the policies of industrialisation that were adopted when Singapore became an independent Republic. The need to look towards overseas markets was critical for national survival. Technical and vocational education has played a crucial role in the development of a skilled workforce to meet the needs of the Singapore's economic development. Over the past two and a half decades, the system of training has evolved in response to socio-economic and technological changes together with the progress of the economy.

12 In the 1960s, technical education was conducted within the school system and was administered by the Technical Education Department of the Ministry of Education. The first significant step towards establishing a separate body to centralise, coordinate and intensify industrial training took place in 1973 with the setting up of the Industrial Training Board (ITB). The main objective then was to expand vocational training so as to increase the supply of skilled manpower urgently required by the new industries and the shift of economic activities from entrepot trade to skill-intensive manufacturing. The formation of ITB marks the formalization of a vocational training system outside the school system.

13 To further improve and consolidate the vocational training system, the ITB was merged with the Adult Education Board in 1979 to form the Vocational & Industrial Training Board (VITB) as a single national authority to promote, develop and provide vocational training. The VITB was recently restructured and replaced by the Institute of Technical Education (ITE) on 1 April 92 as a post-secondary training institution.

The ITE Act

14 The ITE is constituted under the provisions of the Institute of Technical Education Act, 1992 (No 8 of 1992). The principal functions of ITE are :

14.1 To promote and provide technical education and training courses for training of persons employed in or intending to be employed in commerce and industry;

14.2 To upgrade the technical skills of the workforce through continuing education and training;

14.3 To promote industry-based training and education in technical skills;

14.4 To maintain the certification and standards of technical skills;

14.5 To promote and provide consultancy services on technical skills training and education; and

14.6 To promote research on technical skills training and education.

15 The composition of the ITE Board is tripartite consisting of a Chairman, the Chief Executive Officer and other members representing the Government, employers and trade unions.

The ITE Mission

16 The mission of ITE is "to maximise the human potential of Singaporeans through excellence in technical education and training so as to develop the quality of our workforce and enhance Singapore's global competitiveness".

Organisation Structure and Staffing

17 Policy administration is effected through the Chief Executive Officer of ITE and the organisation is supported by 10 functional Divisions. The organisation structure of the ITE is illustrated in Annex 2. The ITE has a staff strength of 1970 comprising 1320 training staff and 650 support staff.

Financing Resources

18 Vocational and technical training is financed almost wholly by government subsidy. The annual operating budget (excluding developmental costs) for ITE is about S$90 million. This represents about 6% of the total expenditure on education.

19 Currently, the government subsidy for full-time courses is 94% of the cost of training, and for part-time continuing education and training (CET) courses 80%. The average cost of full-time training per trainee is about S$5,100 per annum.

IV - PRESENT VOCATIONAL TRAINING SYSTEM

20 The programmes currently administered by ITE can be categorised as follows:

20.1 Full-time pre-employment institutional training for school leavers;

20.2 Part-time continuing education courses and training for workers; and

20.3 Apprenticeship and industry-based training.

Full-Time Pre-Employment Institutional Training

21 Full-time institutional training system is the main feature of the vocational training system in Singapore. As in general education, vocational training is not compulsory for young persons in Singapore. Enrolment is purely voluntary. Special efforts, however, are made in promoting vocational training through open houses and talks to students in schools. Close linkages have been established between ITE and the schools to ensure that courses match the interests and education levels of students for effective progression as shown in Annex 3. In addition, there is also linkage with the polytechnics for the progression of ITE graduates to the Diploma level.

22 Basically, there are 2 main categories of training programmes, one for the primary school leavers (up to 1995) and the other for the secondary school leavers. The Basic Vocational Training (BVT) and National Technical Certificate Grade 3 (NTC-3) cater largely to the primary school leavers, while courses under the Industrial Technician Certificate (ITC), National Technical Certificate Grade 2 (NTC-2), Certificate in Office Skills (COS) and Certificate in Business Studies (CBS) are for secondary school leavers.

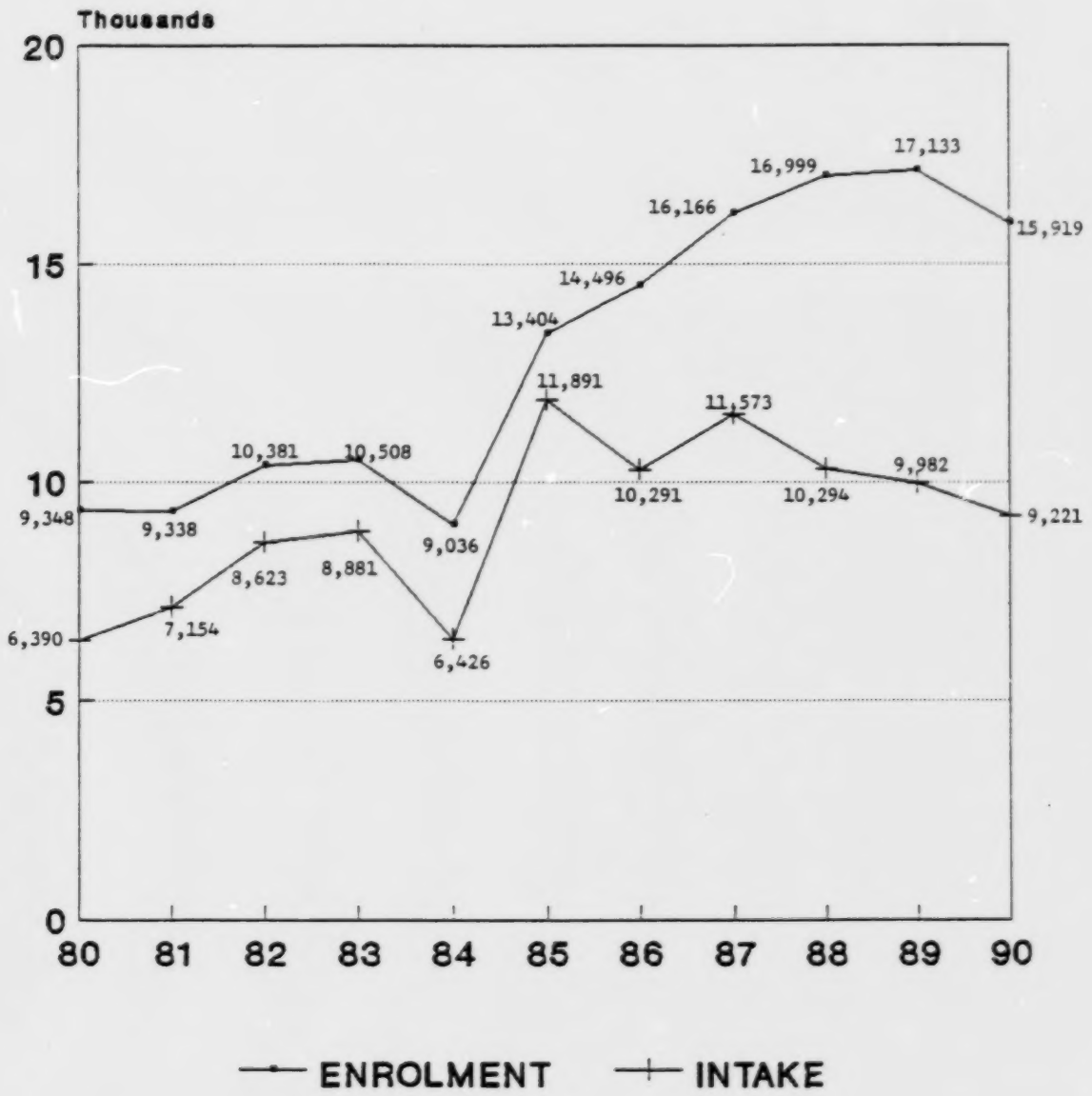
23 A total of 43 courses are offered under the full-time institutional training programme (see Annex 4). These courses are conducted in 10 training institutes run by ITE.

24 The intake and enrolment for full-time courses in 1990 were 9,200 and 16,000 compared with 6,400 and 9,300 respectively in 1980. Figure I shows the intake and enrolment for the last 10 years (1980-1990) while changes between 1980 and 1990 by the type of programmes are reflected in Table I.

Table I : CHANGES IN INTAKE AND ENROLMENT BETWEEN 1980 & 1990 BY PROGRAMME

PROGRAMME	1980		1990	
	INTAKE	ENROLMENT	INTAKE	ENROLMENT
ENGINEERING	954	1,662	1,410	2,482
BUSINESS STUDIES	755	1,339	2,444	3,231
TECHNICAL SKILLS	4,681	6,347	5,367	10,206
OVERALL	6,390	9,348	9,221	15,919

FIGURE I
FULL-TIME INTAKE AND ENROLMENT
(1980-1990)



25 On the average, ITE admits about 10,000 new school leavers annually for full-time institutional training. This represents about 25% of an average school cohort. However, some 19% would drop out of the course annually largely due to attraction of the labour market. The breakdown of enrolment figure by educational background and age group of full-time trainees as at July 1990 is at Table II:

Table II : Breakdown of Enrolment By Educational Background and Age Group

Education / Age	Secondary	Primary	Overall
< 16	-	3,818	3,818(24%)
16-18	5,402	3,323	8,725(55%)
19-20	2,721	47	2,768(17%)
>20	603	5	608(4%)
Total	8,726(55%)	7,193(45%)	15,919(100%)

Continuing Education and Training For Workers

26 The assumption that initial education and training will serve a life long career is no longer true in a modern industrialised economy. The pace of technological changes makes skills obsolete quickly. Thus, continuing education and training (CET) has become an essential means by which workers can be updated and retrained in response to the changing needs of the economy. CET poses a real challenge to national training efforts as the economy reaches greater maturity.

27 In response to the needs for continuing education and training, ITE administers 4 national programmes aimed at upgrading the education and skills of the workforce. These 4 programmes are:

27.1 **Basic Education For Skills Training (BEST)**

This programme was launched in 1983 as a national project targeted at raising the basic literacy and numeracy standard of some 225,000 workers who had less than a primary education. It consists of 4 modules each in English Language and Mathematics. Since its inception, over 170,300 workers or 75% of the target group have attended one or more modules of BEST;

27.2 **Worker Improvement Through Secondary Education (WISE)**

This programme was launched in 1987 with the aim to raise the educational level of the Singapore workforce from primary to the secondary level. It is targeted at some 122,000 workers. The programme patterned along the BEST model also consists of 4 modules each in English Language and Mathematics to prepare the workers for the GCE 'N' level examination. Since its launch, some 40,000 workers or about 33% have participated in the programme;

27.3 **Modular Skills Training Scheme (MOST)**

MOST was launched in October 1986. It is directed at workers who lack basic skills, need new skills or wish to upgrade their present technical skills. The special feature of MOST scheme is that training is offered part-time in modules. Each module is complete in itself, takes 6 months, and leads to certification in an employable skill. This scheme allows flexibility which enables workers to receive training without disruption to their jobs. MOST offers skills courses at NTC-2, NTC-3 and Certificate of Competency (CoC) levels. Since 1987, a total of 34,000 workers have participated in the scheme; and

27.4 **Training Initiative For Mature Employees (TIME)**

TIME, a training programme for workers above 40 years old, was launched in 1991. With the raising of retirement age from 55 to 60 years old and a tight labour market situation, there would be a need to retrain older workers to maximise their potential in meeting today's skills requirements. The attractive features of this programme are its flexible training schedules, exemption from formal educational entry requirements, training in company time and in a language of the worker's choice. To date, about 500 workers have started training under this scheme.

28 In addition, ITE also offers part-time evening and weekend academic education courses from secondary one to GCE 'A' levels. These academic education programmes are conducted in 40 CET centres.

29 The trend of training places taken up under CET programmes over the past 10 years is shown in Figure II. The changes in enrolment (training places) by type of programmes between 1980 and 1990 are given in Annex 5.

Apprenticeship and Industry-based Training

30 Besides full-time institutional training, another viable approach to training young persons is through apprenticeship and industry-based training. As illustrated by the 'dual' system of Germany and On-The-Job Training in Japan, these models have proven to be effective in preparing a quality workforce.

31 ITE supports the efforts of employers in the training of workers in two ways :

31.1 By promoting and supporting apprenticeship training; and

31.2 By encouraging and helping employers to set up in-house training courses through its Approved Training Centre (ATC) scheme.

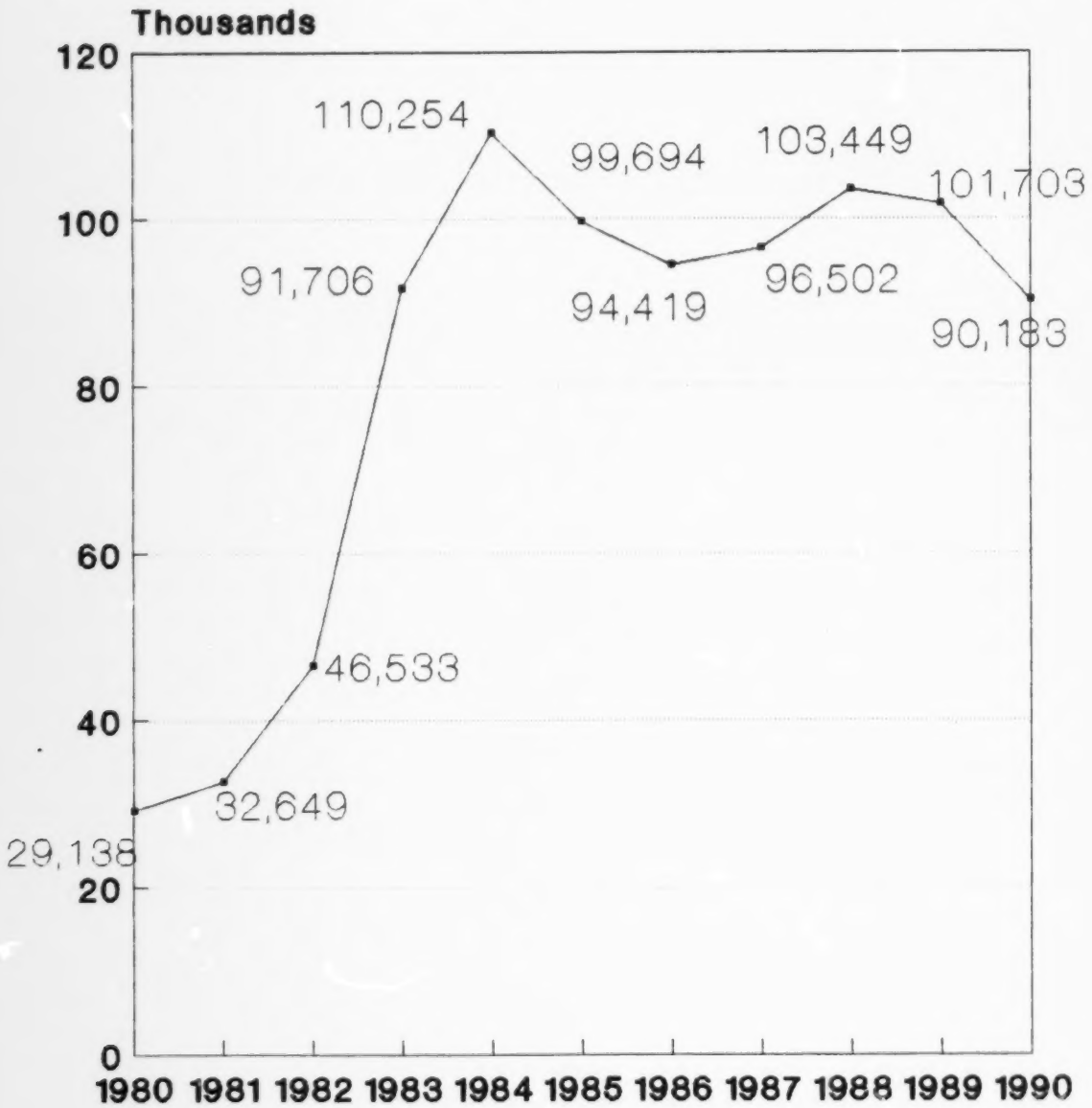
32 The apprenticeship system was recently reviewed. A New Apprenticeship System (NAS) was introduced in 1990 to expand the scope and upgrade the quality of apprenticeship training in Singapore. The new focus on the apprenticeship model is viewed as an important strategy to further strengthen the training system. The NAS modelled closely after the German 'dual' system has the following features:

32.1 Upgrading the pedagogic competence of industry trainers to ensure quality training;

32.2 Incorporation of academic studies in apprenticeship training programmes to ensure a better educated and adaptable workforce; and

32.3 Increased Skills Development Fund (SDF) support to enhance participation of companies in apprenticeship training. (A brief introduction of the SDF is at Annex 6).

FIGURE II
TRAINING PLACES TAKEN UP UNDER CET
(1980-1990)



33 Since the launch in 1990, over 340 companies (an increase of 200% over the number of companies in 1990) from 16 different trade clusters have participated. Currently, there are 52 courses available under the NAS (see Annex 7).

34 The number of apprentices who commenced training in 1991 also increased by 56% to 1594 compared with 1019 in 1990. A breakdown of the number of apprentices who registered by sectors and trades is at Annex 8.

35 In line with the objective of enhancing the quality of apprenticeship training, an Industry Trainer Course consisting of 3 modules was introduced in January 1991. This course is designed to equip industry trainers with the necessary pedagogic, coaching and supervisory skills to train apprentices. As at December 1991, over 500 industry trainers had been trained.

36 The ATC scheme was introduced in 1981 to encourage companies and industry groups to set up their own training centres. ATC status is granted to a company or an industry's centre that meets ITE's criteria in terms of training curricula, facilities and staff expertise. At present, there are 36 ATCs with a total training capacity of about 4600 places in some 50 training programmes leading to national technical certification.

Role of Workers Union in Skills Training.

37 In the training of existing workforce, the workers union - The National Trades Union Congress (NTUC), has taken active roles since early 80s. In August, 1982, the NTUC Skills Development Secretariat was set up to raise the general educational and skills level of existing workers through training and retraining. The objectives of the Secretariat are:

* To provide basic education and generic skills training courses for union members and workers;

* To enable union members and workers to attend basic education and skills training courses at as low a cost as possible; and

* To promote skills training among workers.

38 The Secretariat adopts 4 strategies to fulfil the above objectives.

38.1 Conduct basic literacy and numeracy programmes and other mass training programmes. These include the 4 national programmes administered by ITE namely the BEST, WISE, MOST and TIME programmes.

38.2 Obtain financial assistance for union members in attending basic education and skills training programmes. At present, union members are eligible for 70% SDF subsidy for MOST, TIME and approved courses conducted by ITE and other training institutions.

38.3 Inform workers about the various educational and skills training programmes available and to motivate them to upgrade their skills. The Secretariat works with other organisations such as NPB, ITE, SDF, employer groups to create greater awareness and motivation for training among workers.

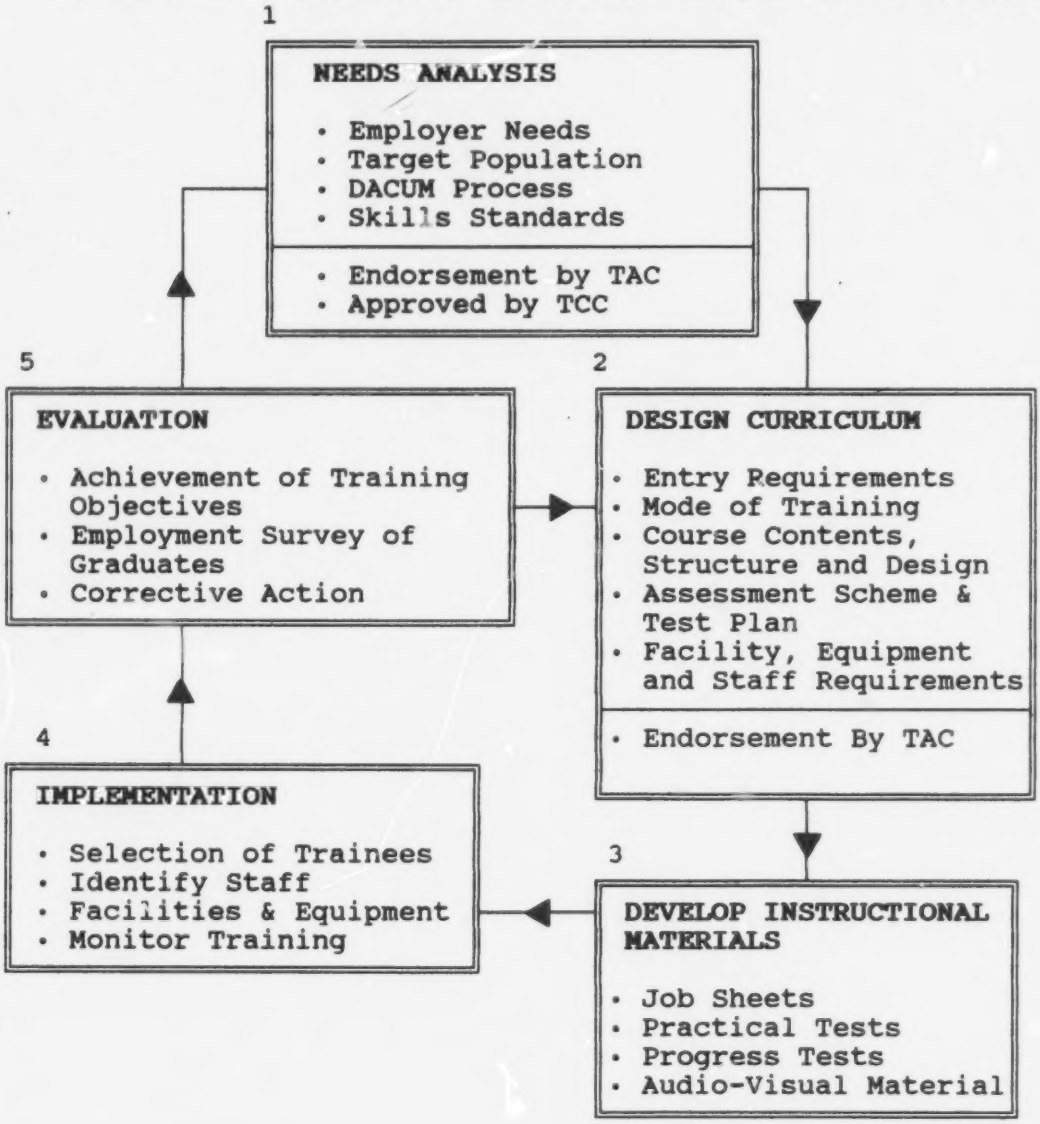
38.4 Works closely with various government bodies and training institutes, unions and employers groups to carry out its strategies. For example, NTUC is a member of the Board of Governors of ITE.

V - SKILLS STANDARDS AND CERTIFICATION SYSTEM

Development of Skills Standards

39 In ITE, a system of curriculum development has been established to ensure that the courses and curricula developed are relevant and meet the requirements of the industries. The process which consists of 5 phases is shown in Figure III:

FIGURE III : PROCESS OF COURSE AND CURRICULA DEVELOPMENT



40 The course and curriculum development process starts with the needs analysis phase. The main purpose of this phase is to gather enough information for ascertaining the need for training, identifying the target population, conducting job analyses and establishing the skills standard for an occupation.

41 The occupational analysis is done through using DACUM - an acronym for Developing A Curriculum (see Annex 9). The outcome of the DACUM process is a single sheet skill profile that serves as both a curriculum plan and an evaluation instrument for occupational training programmes.

42 The skills standard specifies the scope and level of competencies in a job. It is established through the occupational analysis and validated by the industry, namely the employers and the Training Advisory Committees (TAC) appointed by ITE. The primary objective of a skills standard is to set a measurable, observable and acceptable standard of skill performance, including the required related knowledge and attitudes needed to support the satisfactory performance in a job.

43 Currently, there are 12 TACs covering 12 broad disciplines. The main function of these committees is to advise the ITE on matters pertaining to training and certification in trades or occupational areas under their purview. The members are drawn from industry or experts in their respective trades who are well-qualified to speak about skills training requirements for their industries.

44 The TACs constantly review the occupational structure of its industry in which the skilled occupations certifiable by ITE are identified and classified. Efforts are made to match the level of certification and type of courses with occupational requirements in the industries. Examples of such linkages are given in Annex 10.

45 The approval of skills standards and certification of trade and service skills is the Technical Certification Committee (TCC). The TCC consists of members from the public sector, employers groups and trade unions.

Certification System

46 The present certification system certifies skills in 5 categories:

46.1 Industrial Technician Certificate (ITC);

46.2 Certificate in Business Studies (CBS) and Certificate in Office Skills (COS);

46.3 National Technical Certificate (NTC) Grade 1 to 3;

46.4 Certificate of Competency (CoC); and

46.5 Certificate of Service Skills.

47 The ITC certifies skills at the technician level. The CBS and COS certify skills in business services. The CoC certifies skills which are narrow and specific in nature and the Certificate of Service Skills caters to areas such as Retail Sales, Travel and Tourism and Health Care.

48 The National Technical Certificate (NTC) system established in 1973 is a major component in the certification system. It comprises a 3-tier skills system leading up to a master level:

48.1 **National Technical Certificate Grade 1 (NTC-1)**

This represents the highest level of attainment of knowledge and skills in an occupation, ie the equivalent to the German 'meister' or master craftsman. It is attained by an NTC-2 holder after a minimum of 3 years of working experiences and a year of full-time training in areas of advanced knowledge and skills;

48.2 **National Technical Certificate Grade 2 (NTC-2)**

This represents the attainment of full knowledge and skill proficiency for a specialised occupation. This is the skilled level attained by an institutional trainee on completion of 2 years' full-time training, or by person on completion of an approved apprenticeship programme, or by a craftsman after a minimum of 3 years of on-the-job experience in the relevant trade subsequent to obtaining NTC-3; and

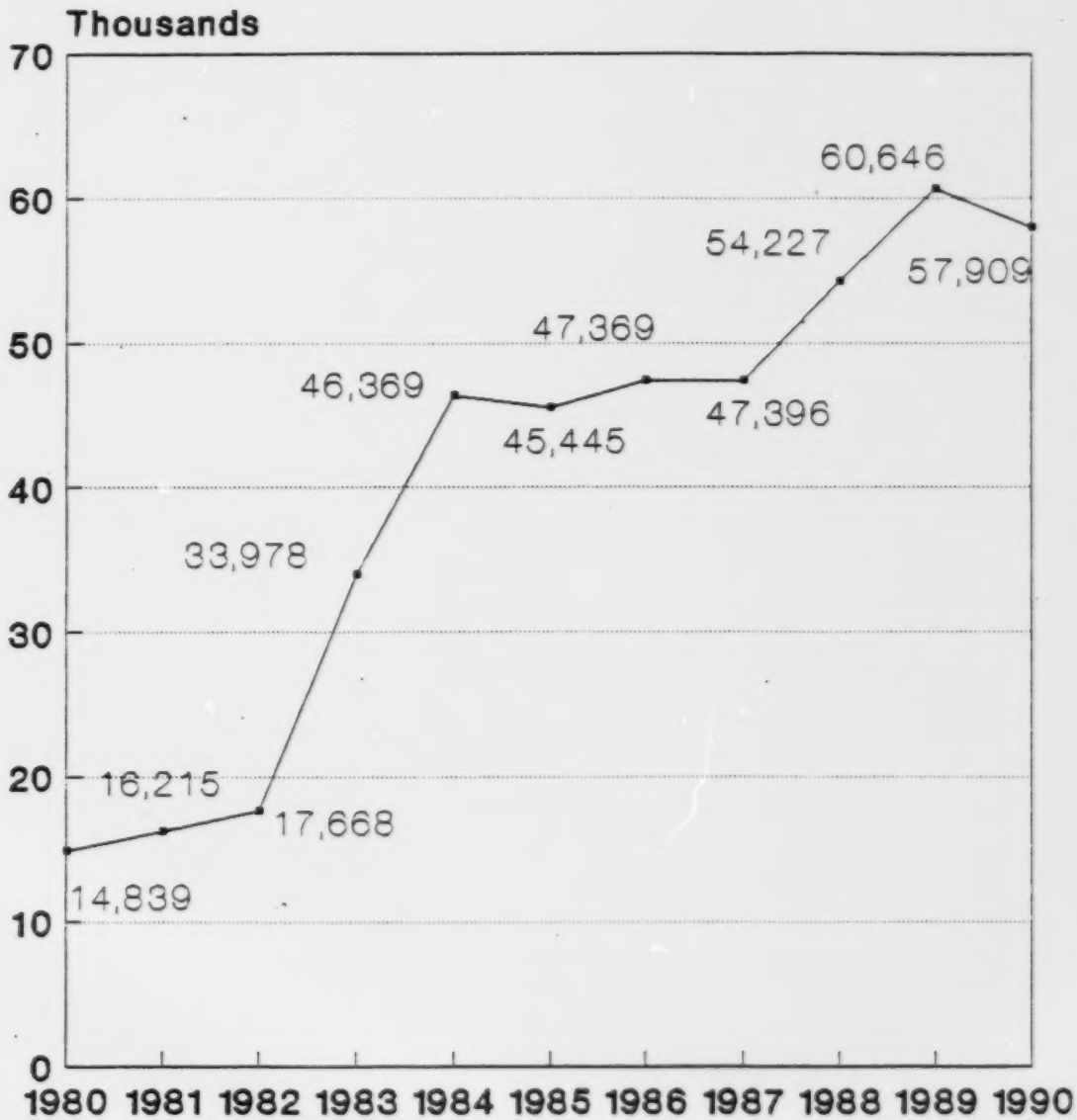
48.3 **National Technical Certificate Grade 3 (NTC-3)**

This represents the attainment of the basic knowledge and skills of a trade, upon which a person can further develop to become a skilled worker. This is normally attained by a person who has completed one to 2 years of basic training at a training institute or who has completed at least one year of an approved apprenticeship training programme.

49 The ITC, CBS and COS certificates are awarded only to those who have successfully completed formal institutional courses (full-time or part-time). The NTC-2 and NTC-3 are obtainable through formal institutional training or Public Trade Testing (PTT). The PTT introduced in 1973 allows workers without any formal training but with relevant work experience to sit for test under the NTC system to determine their skill level. Some 50 trades at the CoC, NTC-3 and NTC-2 levels can be certified through the PTT. The eligibility criteria for the PTT are set out in the chart at Annex 11.

50 The total number of candidatures for examination and trade testing increases from 14,839 in 1980 to 57,909 in 1990 (as shown in FIGURE IV).

FIGURE IV
TREND IN CANDIDATURE FOR EXAMINATION AND TRADE TESTING (1980-1990)



VI - EXPERIENCES WITH PRESENT TRAINING SYSTEM

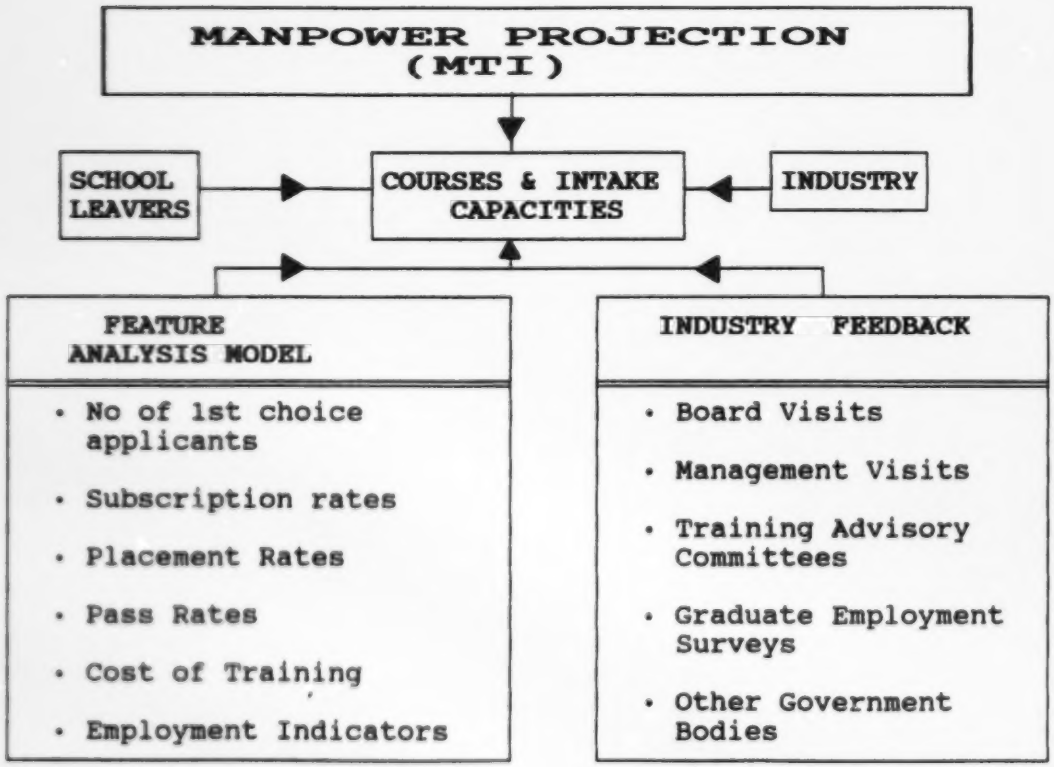
Effectiveness of Training

51 The planning of national manpower development and training system at the national level is coordinated by the Council on Professional and Technical Education (CPTE). The CPTE, chaired by the Minister of Trade and Industry (MTI), reviews the demand and supply of professional & technical manpower and approves the enrolment targets for all levels of educational and technical institutions. The composition of the CPTE comprises senior members in various ministries including the Minister for Education.

52 The national manpower needs established by the MTI is based on projection of economic growth, the projection of demographic change, the quantity and quality of existing workforce etc. A brief description of the projection model is at Annex 12.

53 At the ITE level, various feedback mechanisms and analyses are used to translate the manpower projected by MTI into training courses as shown in Figure V.

FIGURE V : PLANNING ITE COURSES



The Feature Analysis Model

54 A Feature Analysis Model is used to evaluate the effectiveness of the various training programmes. The model consists of a total of 13 performance indicators classified into 6 major groups (see Annex 13). The total scores of 40 courses evaluated in 1990 are shown in Annex 14.

55 The Feature Analysis Model has helped ITE to evaluate the performance of the courses. Through this process, better-performing courses and poor-performing courses can be systematically identified. Some 50 poor-performing courses had been discontinued over the last 10 years. Currently, ITE is carrying out feasibility studies to restructure some of the less popular full-time courses such as Dressmaking, Hairdressing and Furniture Production so that these courses could be offered under the apprenticeship training scheme.

Employers' Views

56 To maintain close relationship with the industries, ITE board members and management staff visit relevant industries regularly. During these visits, feedback on the relevant courses and training needs are sought.

57 A survey was carried out in 1987 by the former VITB to seek employers' views on its graduates. The survey covered 500 firms which employed VITB's graduates and the objectives were to establish how familiar employers were with the functions of VITB, the adequacy of skills training provided, work attitudes of graduates, and the graduates' readiness to accept further training.

58 The findings revealed that majority (over 90%) of the employers were satisfied with vocational training received by VITB graduates. Employers were pleased with the technical skills and work attitudes of VITB graduates. Their ratings are summarised at Annex 15.

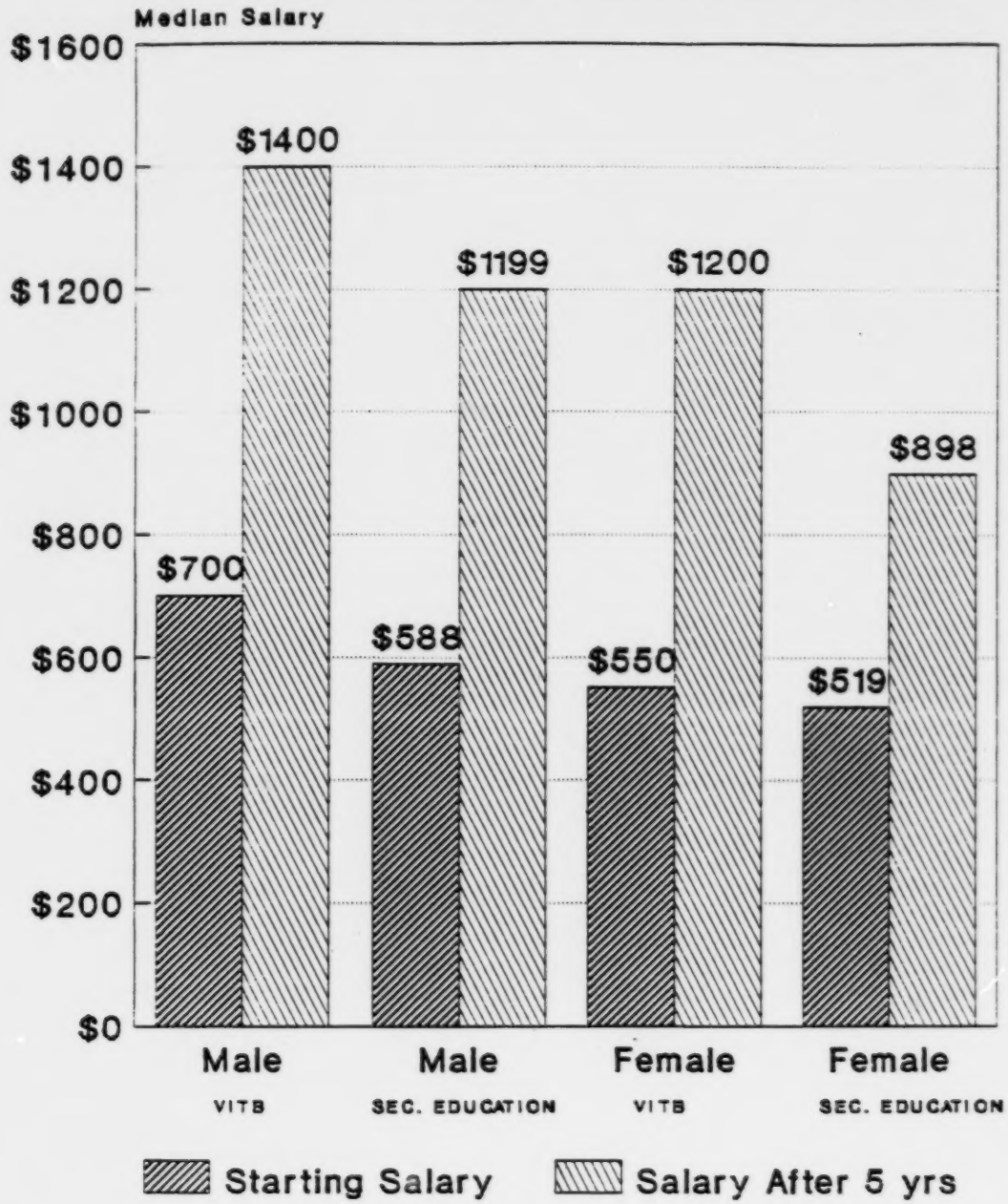
Trainees' Views

59 The effectiveness of full-time training programmes from the trainees' viewpoint is evaluated annually through the recurrent surveys on employment experience of fresh graduates.

60 The key employment indicators derived from these graduates for the past 5 years are given in Annex 16.

61 Generally, VITB graduates who have been in the labour market for 5 years earned higher salaries (17% more for males and 34% for females) than those secondary school leavers who did not take up any formal training (see Figure VI).

Figure VI
Median Salary of VITB Graduates
and Working Persons With Secondary Education Only



Experiences and Lessons

62 Since 1978, the VITB and its predecessor ITB, have trained and certified a total of 150,000 skilled workers for the economy.

63 The majority of the secondary school leavers who take up technical training are able to complete their courses successfully and secure jobs in areas for which they are trained in. Generally, they are also paid higher salaries and have better career prospects compared with those who do not take up training.

64 Unfortunately, this same experience was not shared by the primary school leavers who enrol in vocational training. About 40% of trainees who only have a primary education do not complete their training to qualify for the NTC-3 certificate and among those who completed, about one-third would fail the theory component of the final NTC-3 examination.

65 The reason for the difference is the low level of literacy and numeracy skills of the primary school leavers. Their lack of competencies in English language and Mathematics greatly hinder their ability to cope with the demand of the technical skills training. This is a weakness in the present system.

66 In addition, the Graduates' Employment Surveys show that 75% of the NTC-3 graduates with only a primary education are not employed in jobs that they are trained in. Their skills at NTC-3 level no longer match the needs of the industry which has upgraded its products and services. In other words, employers need vocational graduates with at least a secondary education in a changed work environment.

VII - RECOMMENDATIONS TO UPGRADE VOCATIONAL TRAINING

Reviews On Education and Training

67 In 1990, VITB's experience in the training of primary school leavers was shared with the Review Committee for Primary School Education set up by the Minister of Education. Among the recommendations of the Review Committee are two which have direct implications on vocational training. These are that:

67.1 All pupils will receive at least 10 years of general education, including secondary education, before they proceed for further education and training; and

67.2 A new Normal (Technical) course will be introduced in secondary schools for those who are more inclined towards technical studies.

Plans to Upgrade

68 In response to the changes in the education system, VITB also reviewed the vocational training system resulting in the announcement in March 1991 of four major plans to upgrade vocational training in Singapore. These plans are:

68.1 **Upgrading VITB to a Post-Secondary Institution**

VITB would no longer enrol primary school leavers for Basic Vocational Training Programmes leading to NTC-3 Certificate when the improved school education system is implemented by 1994. Courses under the NTC-2 level for secondary school leavers will be expanded. The NTC-3 full-time courses would gradually be phased out. Following this review, the former VITB has been restructured and replaced by a new organisation, the Institute of Technical Education (ITE) on 1st April 1992. ITE is a post-secondary institution whose focus is to provide technical training for school leavers who have completed 10 years of general education.

68.2 **Expanding Scope of Apprenticeship Training**

Apprenticeship training has proven to be an effective alternative approach in preparing school leavers for employment in Germany and Switzerland. Besides skills acquisition, apprenticeship training is able to instil such personal values as good work attitudes and company loyalty. With Singapore gearing to become a developed nation by the end of this century, its industries are now ready to play a more active role in training the workers they need. Apprenticeship provides the opportunity. The scope of apprenticeship will be

expanded to cover service and commerce skills so as to widen the options for school leavers. Some newly developed courses under the apprenticeship system include Aerospace Skills, Retail Sales, Health Care, Travel & Tourism and Computer Operations.

68.3 **Progression Opportunities**

More opportunities will be provided for ITE's graduates to progress to further education and higher levels of training, both within its internal system and to the Polytechnics. The restructured system of technical training for secondary school leavers to be implemented by ITE is shown in Annex 17. About 200 places are set aside for the ITC, CBS and NTC-2 graduates for admission into the relevant Diploma courses. This would be adjusted in the future depending on the performance of the ITE's graduates and demand.

68.4 **Upgrading Training Environment**

As a post-secondary institution, ITE aims to provide an interesting and total training environment for the secondary school leavers. Between 1992 and 1997, ITE plans to build 7 new institutes and redevelop 3 existing ones at a capital cost of S$250 million. The workshop, laboratories and training room will be designed to achieve a better integration in the teaching of theory and practice in the skills training courses.

VIII - CONCLUSIONS

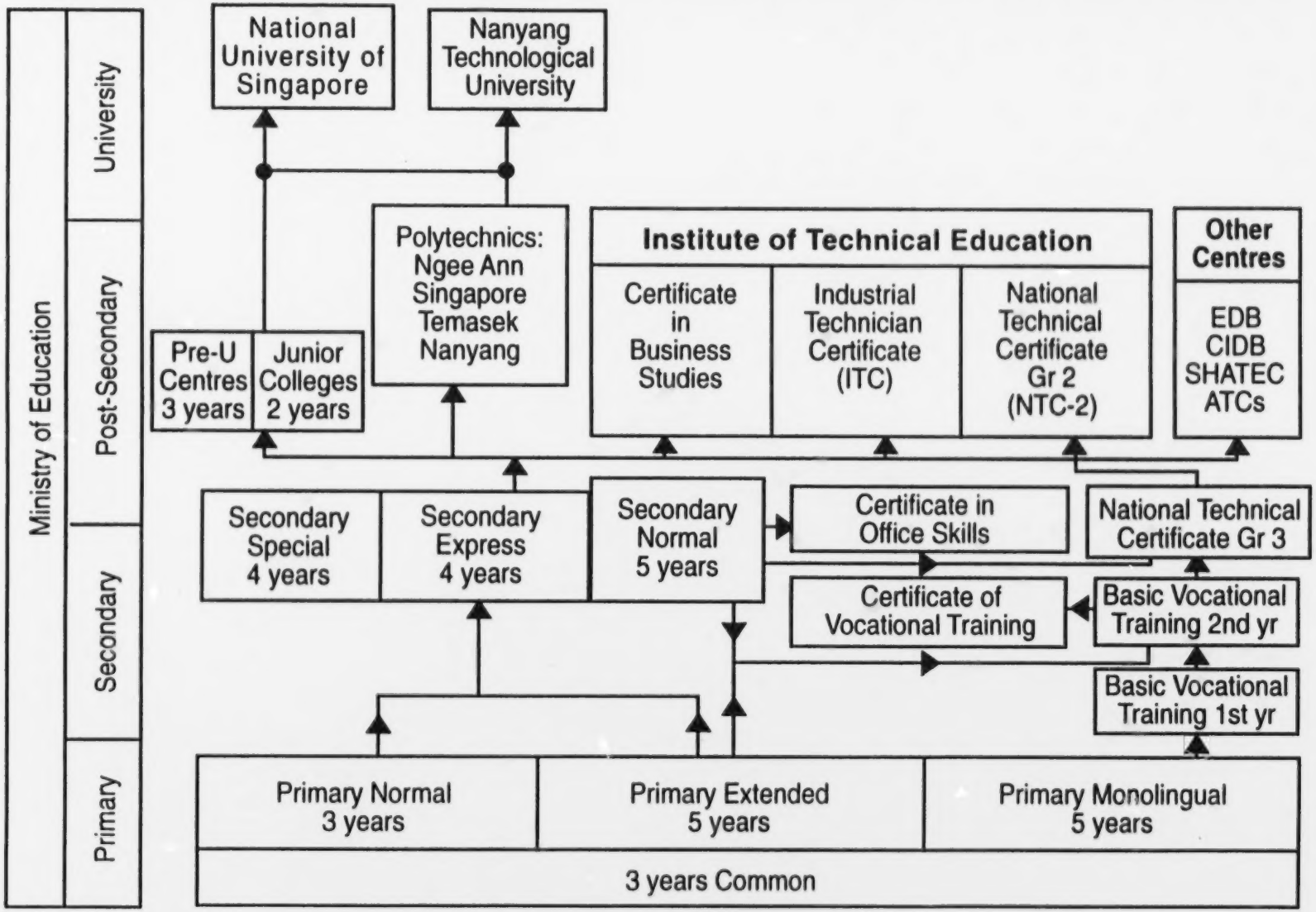
69 Vocational training is dynamic. In Singapore, the training system has undergone significant changes in its relatively short history. The upgrading process must continue if the system is to stay relevant in the light of changes in education, technology, economy and aspirations of school leavers and working adults.

70 Two major reviews on education and vocational training in 1990 have led to fundamental changes and a restructuring of vocational training. The basic philosophy is that all pupils will receive at least 10 years of general education, including secondary education, before they proceed for further education and training.

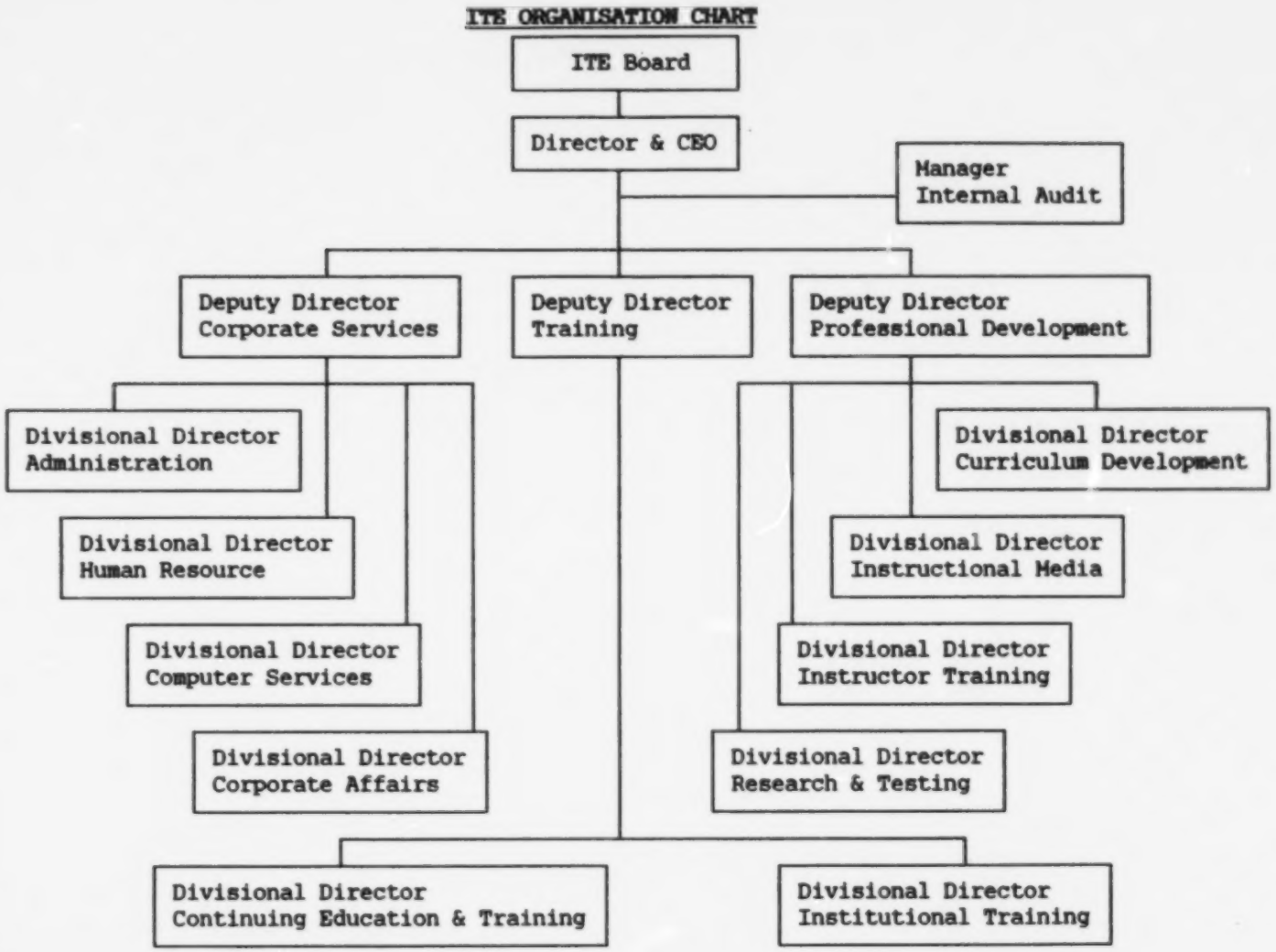
71 A new organisation, the Institute of Technical Education (ITE) has just been established, taking over the functions of the former Vocational & Industrial Training Board (VITB). As a post-secondary institution, the new ITE will be better positioned to meet the needs of school leavers, working adults and the economy.

72 New plans and strategies have been formulated to further upgrade the vocational and technical training system in Singapore. There will be renewed emphasis on apprenticeship and intensified efforts to promote continuing education and training. Many challenges lie ahead. There are also new opportunities.

EDUCATION AND TRAINING IN SINGAPORE

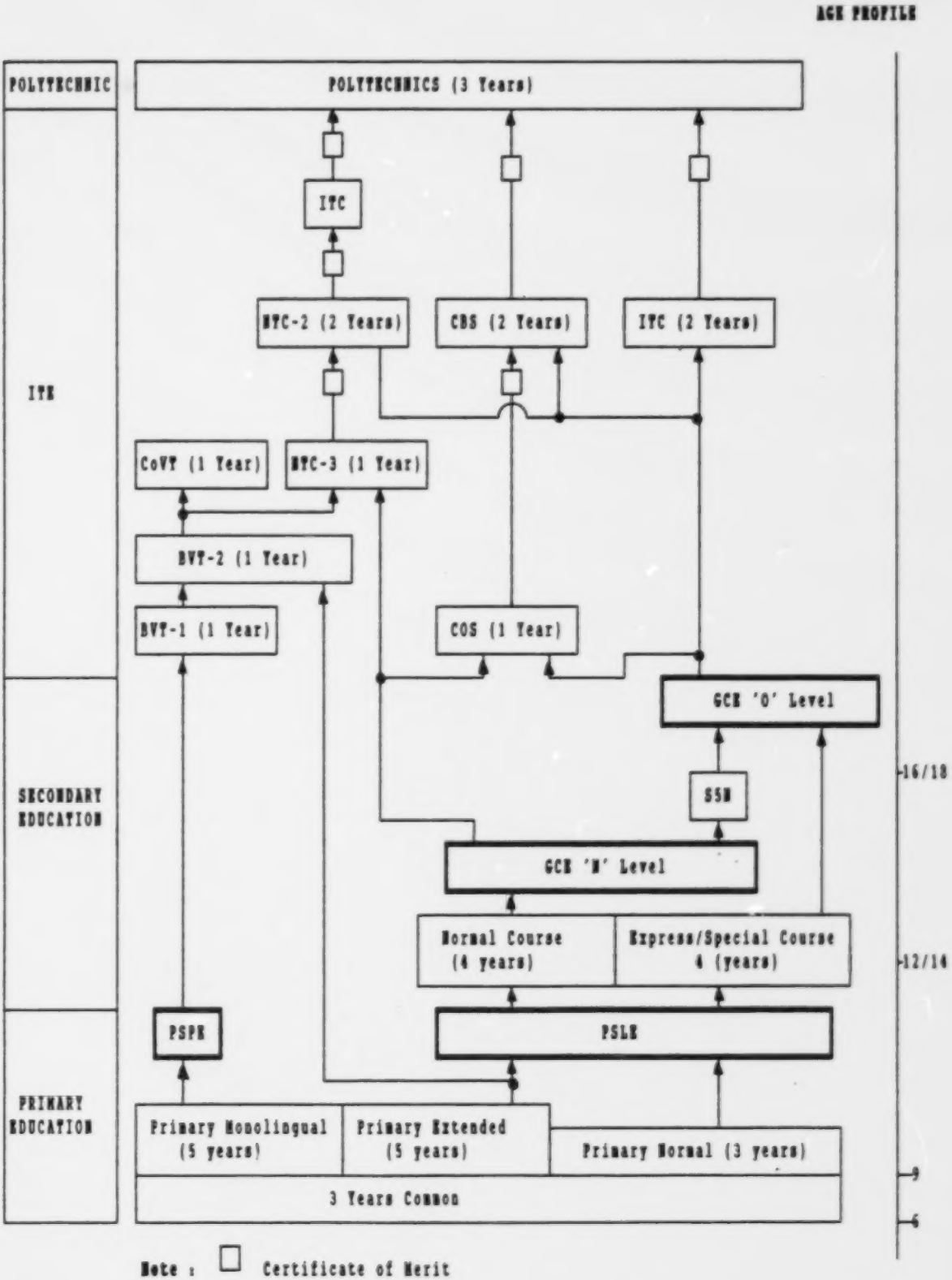


Annex 1


ITE ORGANISATION CHART
ITE Board
Director & CEO
Manager
Internal Audit
Deputy Director
Corporate Services
Deputy Director
Training
Deputy Director
Professional Development
Divisional Director
Administration
Divisional Director
Human Resource
Divisional Director
Computer Services
Divisional Director
Corporate Affairs
Divisional Director
Curriculum Development
Divisional Director
Instructional Media
Divisional Director
Instructor Training
Divisional Director
Research & Testing
Divisional Director
Continuing Education & Training
Divisional Director
Institutional Training

Annex 3

SYSTEM OF PROGRESSION FROM SCHOOLS TO VOCATIONAL TRAINING



Note : ☐ Certificate of Merit

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Annex 4

FULL-TIME COURSES BY SECTOR AND TRADE CLUSTER (DEC 91)

Sector	Trade Cluster	Course
Manufacturing	Precision Engineering	ITC Mechanical Engineering NTC-2 Precision Machining NTC-2 Tool & Die Making (Injection Mould) NTC-2 Tool & Die Making (Press Tool) NTC-3 Metal Machining
	Electrical	ITC Electrical Engineering NTC-2/3 Electrical Fiting & Installation NTC-2 Electrical Power & Machines
	Electronics	ITC Electronics Engineering NTC-2 Electronics Servicing (Digital) NTC-2 Electronics Servicing (Video) NTC-2 Electronics Servicing (Instrument) NTC-3 Electronics Servicing CoVT
	Automation	ITC Electro-Mechanical Engineering NTC-2 Electro-Mechanical Servicing
	Printing	NTC-2/3 Graphic Reproduction NTC-2/3 Offset Printing
	Woodbased	NTC-3 Furniture Production NTC-3 Upholstery
Technical Support	Mechanical & Maintenance	NTC-2/3 Air-Conditioning & Refrigeration Mechanics NTC-2/3 Maintenance Fiting
	Automotive	NTC-2/3 Motor Vehicle Mechanics NTC-2/3 Heavy Duty Diesel Mechanics
	Drafting & Building Servicing	ITC Mechanical & Electrical Drafting & Design NTC-2 Architechtural Drafting NTC-2 Civil & Structural Drafting NTC-3 Building Drafting NTC-3 Building Servicing
	Marine & Fabrication	NTC-3 General Welding NTC-3 Marine Fitting
Finance & Business	Business Studies	CBS (Accounting) CBS (Secretarial Practice) Certificate in Office Skills
Service	Garments/Textiles	NTC-2/3 Dressmaking CoVT
	Hairdressing	NTC-3 Hairdressing
	Retail Sales	CoVT
	Hotel/Catering	CoVT

CHANGES IN CET ENROLMENT (TRAINING PLACES) BY TYPE OF PROGRAMMES

Programme	FY80	FY90	% Change
VITB CET			
Industrial Skills	7,214	19,120	+165%
Business Studies	2,545	-	-
Academic Education	10,251	20,453	+100%
Languages	6,202	-	-
Customised	2,926	1,543	-47%
Sub-Total	29,138	41,116	+41%
Industry-Based			
Apprentices	2,423	1,445	-40%
Non Apprentices	885	1,296	+46%
Sub-Total	3,308	2,741	-17%
Worker Education			
Basic Education for Skills Training (BEST)	-	29,759	NA
Worker Improvement through Secondary Education (WISE)	-	20,519	NA
Sub-Total	-	50,278	-
Total	32,446	94,135	190%

Brief On Skills Development Fund (SDF)

1 The Skills Development Fund (SDF) was established under the Skills Development Levy Act (Cap 306) in 1979, to promote and support the skills training and upgrading of workers. It is funded by a levy of 1% on the wages of all employees (including public sector) earning $750 a month or less. The Fund is to be used for the following purposes:

- The promotion, development and upgrading of skills and expertise of persons in employment;
- The re-training of retrenched persons; and
- The provision of financial assistance by grants, loans, or otherwise for skills upgrading and re-training.

2 The operations of the SDF is guided by 2 fundamental principles:

2.1 The SDF offers grants specially as incentives for companies to undertake worker training. Workers are defined as those with GCE 'A' level qualifications and below, and /or earning $1,000 and below a month; and

2.2 SDF grants are awarded only for employer-based training to ensure that training has the accountability of the workplace. The company must identify the training required to upgrade its employers and undertake to fully fund the training programmes.

3 The SDF is the responsibility of the Ministry for Trade and Industry and is administered by the National Productivity Board.

4 The SDF supports companies participating in apprenticeship training by awarding the following flat grants in accordance with the level of certification:

Level of Certification	SDF Grants
Unskilled to NTC-3	$4,000
NTC-3 to NTC-2	$6,500
Unskilled to NTC-2	$8,500

5 The SDF supports amount to about 50% of the companies' direct allowable costs of apprenticeship training.

6 The grants for apprenticeship training is adminstered by the ITE and it is also ITE's responsibility to regulate and monitor the companies' compliance with the provisions of the apprenticeship contract.

APPRENTICESHIP COURSES AVAILABLE
(JAN 92)

NTC-2 Courses

1 Aircraft Mechanics (Electrical & Instruments)

2 Aircraft Mechanics (Powerplant)

3 Aircraft Mechanics (Radar & Communication)

4 Aircraft Mechanics (Sheetmetal)

5 Air-Conditioning & Refrigeration Mechanics#*

6 Arc Welding

7 Boiler/Pipe Fitting & Installation

8 Electrical Fitting & Installation#*

9 Electrical Power & Machines#

10 Electro-Mechanical Servicing#*

11 Electronics Servicing (Digital Equipment)#*

12 Food & Beverage Service

13 Food Preparation

14 Front Office Operations

15 Furniture Production

16 Graphic Reproduction

17 Heavy Duty Diesel Mechanics#*

18 Maintenance Fitting#

19 Marine Fitting

20 Marine Steelwork

21 Motor Vehicle Mechanics (Heavy Vehicles)

22 Motor Vehicle Mechanics (Light Vehicles)#

23 Offset Printing

24 Offset Printing (Web-Offset)

25 Precision Machine Fitting (Machine Tool)

26 Precision Machining#

27 Precision Optics

NTC-3 Courses

1 Aircraft Mechanics (Electrical & Instruments)

2 Aircraft Mechanics (Sheetmetal)

3 Boiler/Pipe Fitting & Servicing

4 Dressmaking#*

5 Electrical Fitting & Installation#

6 Electronics Servicing#*

7 Food & Beverage Servicing

8 Food Preparation

9 Furniture Production#

10 General Welding#

11 Graphic Reproduction#

12 Hairdressing#*

13 Maintenance Fitting#

14 Marine Fitting#

15 Marine Steelwork

16 Metal Machining#

17 Offset Printing#*

Certificate Courses

1 Retailing (Sales & Customer Service)*

2 Travel Service*

3 Office Skills#*

CoC Courses

1 Binding & Finishing

2 Die Casting Machine Setting

3 Heat Treatment

4 Spray Painting

5 Woodworking Machine Operations

Note:

Course also available under full-time training offered by VITB.

* New apprenticeship courses introduced since Oct 90.

NO OF APPRENTICES REGISTERED IN 1990/91 BY SECTORS, TRADE CLUSTERS AND COURSES

Sector	Trade Cluster	Course	Whole of 1990	Whole of 1991
Manufacturing	Precision Engineering	NTC-2 Precision Machining	116	87
		NTC-2 Precision Optics	45	48
		CoC Die-Casting Machine Setting	11	25
		Coc Heat Treatment	11	15
	Electrical	NTC-2 Electrical Fitting & Installation	23	22
		NTC-3 Electrical Fitting & Installation	50	23
		NTC-2 Electrical Power & Machines	16	34
	Electronics	NTC-2 Electronics Servicing (Digital Equip)	0	12
		NTC-3 Electronics Servicing (Digital Equip)	0	21
	Automation	NTC-2 Electro-Mechanical Servicing	0	9
	Printing	NTC-2 Graphic Reproduction	4	12
		NTC-3 Graphic Reproduction	1	45
		NTC-2 Offset Printing	34	43
		NTC-3 Offset Printing	0	2
	Woodbased	NTC-2 Furniture Production	24	20
		NTC-3 Furniture Production	11	9
		CoC Woodworking Machine Operations	0	10
Finance & Business	Business Studies	Certificate in Office Skills	0	21
Technical Support	Aerospace	NTC-2 Aircraft Mechanics (Elec & Instrument)	12	11
		NTC-2 Aircraft Mechanics (Airframe & Engine)	39	35
		NTC-3 Aircraft Mechanics (Airframe & Engine)	65	98
		NTC-2 Aircraft Mechanics (Radar & Comm)	71	74
		NTC-3 Aircraft Mechanics (Sheetmetal)	59	106
	Automotive	NTC-2 Motor Vehicle Mechanics	52	165
		NTC-3 Motor Vehicle Mechanics	4	2
		NTC-2 Heavy Duty Diesel Mechanics	10	20
		Certificate in Motor Vehicle Inspection	12	0
	Marine & Fabrication	NTC-2 Boiler/Pipe Fitting Servicing	0	1
		NTC-3 Boiler/Pipe Fitting Servicing	4	10
		NTC-2 Marine Fitting	45	160
		NTC-3 Marine Fitting	94	83
		NTC-2 Marine Steelwork	2	5
		NTC-3 Marine Steelwork	17	39
		NTC-2 Arc Welding	16	3
		NTC-3 General Welding	17	56
		NTC-2 Watchkeeping	0	3
		NTC-2 Plant Maintenance Mechanics	1	0

Sector	Trade Cluster	Course	Whole of 1990	Whole of 1991
Technical Support	Mechanical & Maintenance	NTC-2 Aircon & Refrigeration Mechanics	0	28
		NTC-2 Maintenance Fitting	18	45
		NTC-3 Maintenance Fitting	8	3
Servic	* Garments/ Textile	NTC-3 Dressing	0	7
	* Hairdressing	NTC-3 Hairdressing	0	8
	Hotel/ Catering	NTC-2 Food & Beverage	60	50
		NTC-3 Food & Beverage	5	1
		NTC-2 Food Preparation	28	42
		NTC-3 Food Preparation	1	1
		NTC-2 Front Office Operations	33	16
	* Retail Sales	Certificate in Retailing (Sales & Customer Service)	0	12
	* Travel	Certificate in Travel Services (Gen)	0	52
		Total	1019	1594

Note:

* New trades introduced since Oct 90

DACUM

DACUM is a relatively new and innovative approach to occupational analysis. It has proven to be a very effective method of quickly determining, at relatively low cost, the competencies or tasks that must be performed by persons employed in a given job or occupational area.

The profile chart that results from the DACUM analysis is a detailed and graphic portrayal of the skills or competencies involved in the occupation being studied. The DACUM analysis can be used as a basis for (1) curriculum development, (2) student learning, (3) training needs assessment, (4) worker performance evaluations, and (5) competency test development.

DACUM has been successfully used to analyze occupations at the professional, technical, skilled and semi-skilled levels. DACUM operates on the following three premises : (1) expert workers are better able to describe/define their job than anyone else, (2) any job can be effectively and sufficiently described in terms of the tasks that successful workers in the occupation perform, and (3) all tasks have direct implications for the knowledge and attitudes that workers must have in order to perform the tasks correctly.

A carefully chosen group of about 10-12 experts from the occupational area form the DACUM committee. Committee members are required directly from business, industry or the professions. The committee works under the guidance of a facilitator for two days to develop the DACUM chart. Modified small-group brainstorming techniques are used to obtain the collective expertise and consensus of the committee.

The DACUM committee is carefully guided through each of the following steps by the co-ordinator:

1 Orientation

2 Review of job or occupational area description

3 Identification of general areas of job responsibility

4 Identification of specific tasks performed in each of the general areas of responsibility

5 Review and refinement of tasks statements

6 Sequencing of tasks statements

7 Identification of entry-level tasks

8 Other options, as desired

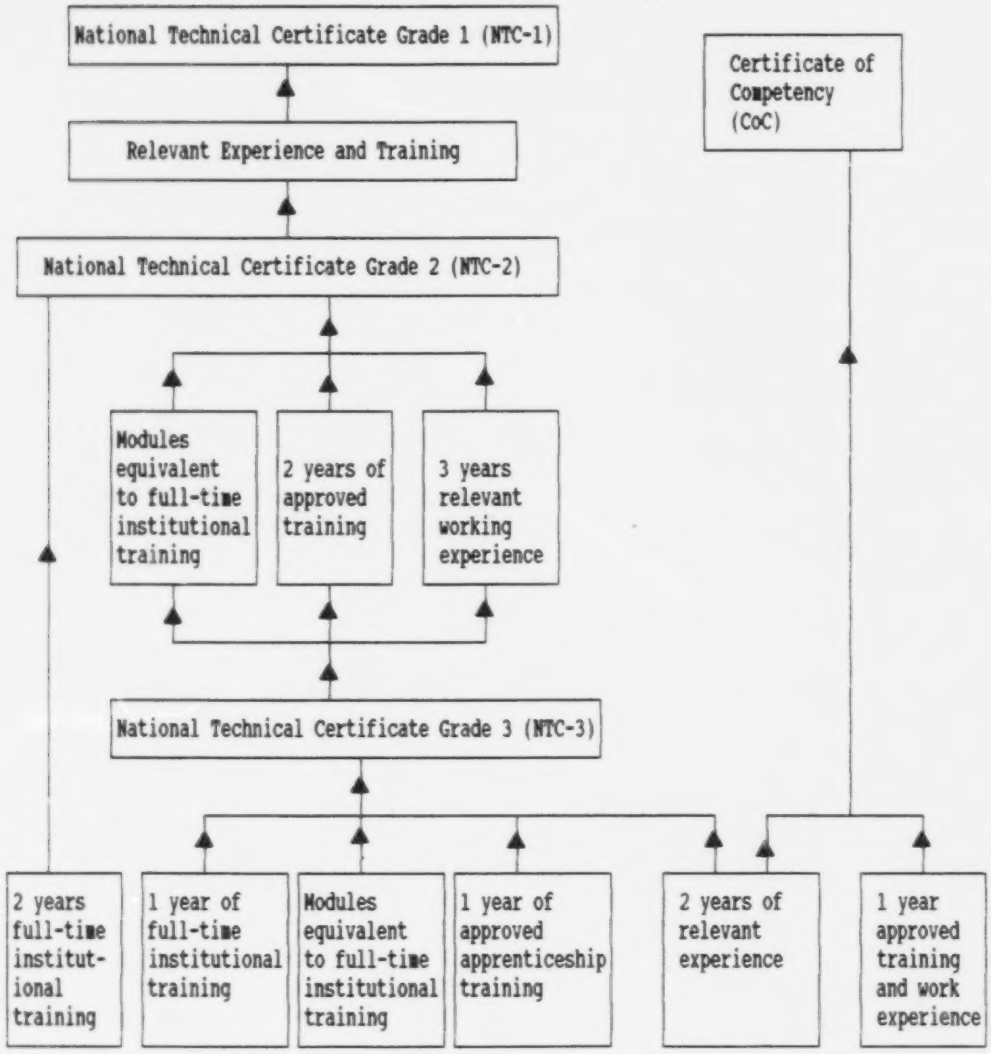
Because of their current occupational expertise, committee participants do not need to make any advance preparations.

LINKAGE BETWEEN COURSES AND OCCUPATIONS

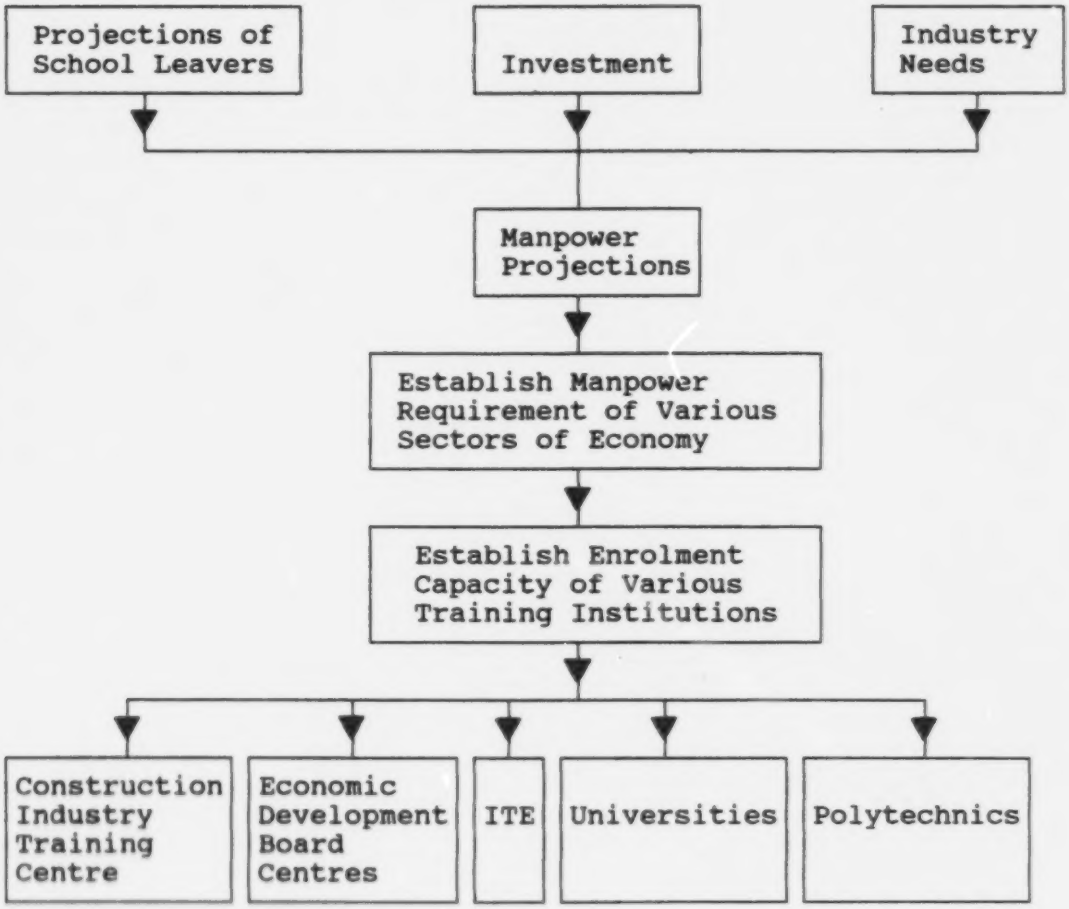
Trade Cluster	Course	Occupation (Job Title*)
Precision Engineering	NTC-2 Precision Machining	Boring & Drilling Machine Setter - Operator Boring Machine Setter - Operator Lathe Operator/Lathe Setter - Operator Machine Setter/Machine Setter - Operator Milling Machine Setter - Operator Numerical Control (NC) Machine Setter - Operator Precision Grinding Machine Setter - Operator Other Machine Tool Setter - Operator Technical Equipment Sales Representative Tool Grinder (Machine Tool)
Electronics	ITC Electronics Engineering	Electronics Engineering Technician (General) Instrumentation Technician (Electronics) Semiconductor Technician Technical Sales Representative Technical Service Advisor Audio and Video Equipment Technician) Control-room Technician (Radio and Television Broadcasting)) Radio and Television Technician) Graduates Specializing in Video Systems Sound-effects Technician) Television Engineering Technician) Television Engineering Technician) Radar Technician) Graduates Specializing in Radio Radio Engineering Technician) Communications & Navigational Aids Signal Systems Technician) Telecommunications Technician) Computer Systems Technician) Graduates Specializing in Computer Computer Technician) Technology

* Based on Singapore Standard Occupational Classification (SSOC) 1989.

NATIONAL TECHNICAL CERTITIFICATE AND CERTIFICATE OF COMPETENCY SYSTEMS


National Technical Certificate Grade 1 (NTC-1)
Relevant Experience and Training
National Technical Certificate Grade 2 (NTC-2)
Modules equivalent to full-time institutional training
2 years of approved training
3 years relevant working experience
National Technical Certificate Grade 3 (NTC-3)
Certificate of Competency (CoC)
2 years full-time institut-ional training
1 year of full-time institutional training
Modules equivalent to full-time institutional training
1 year of approved apprenticeship training
2 years of relevant experience
1 year approved training and work experience

PROJECTION OF NATIONAL MANPOWER NEEDS (MTI, CPTE)



PERFORMANCE INDICATORS USED IN THE FEATURE ANALYSIS MODEL

Group	Weightage	Performance Indicator	What Indicator Measures
1 National Manpower Requirement	30%	1 Compatibility of CPTE's projected intake in 1990 with actual number admitted in 1990	The extent to which VITB's actual intake meets the projected intake
2 Context of Training (Training Source/ Facilities)	10%	2 Compatibility of output between VITB and other institutions offering similar training	The extent to which local training institutions are offering similar type of training
		3 Cost of training	The cost of training a trainee
		4 Trainer - trainee ratio	The number of staff required to conduct the respective courses
3 Training Process	20%	5 Number of first choice applicants	The interest of students in the various VITB courses
		6 Subscription rate	The demand of a course with respect to the vacancies available
		7 Placement rate	The intake for the course with respect to the vacancies available
		8 Dropout rate	The retention power of the course in keeping the trainees before they complete their training
4 Output From Training	10%	9 Pass rate	The extent to which trainees in a course successfully completed their training
5 Outcome of Training	20%	10 Time spent to acquire first job by graduates	The ability of graduates from a course to find employment within a reasonable period after completing their course
		11 Employment rate of graduates	The extent to which graduates from a course are employed
		12 Training-related placement rate	The extent to which graduates from a course finding jobs related to their training

Group	Weightage	Performance Indicator	What Indicator Measures
6 Benefit From Training	10%	13 Starting Salaries	The extent to which graduates from a course benefit in terms of the salaries they earned

The score of each group was computed based on the following formula:

$$\text{Group Score} = \sum_{i=1}^{n} (Yi)/5 \times X\%/N$$

where Yi is the number of points scored by the indicator
X is the weightage assigned to the group and
N is the number of indicators in the group.

In this case, for groups 1, 4 and 6, N = 1;
for groups 2 and 5, N = 3; and
for group 3, N = 4

PERFORMANCE INDICATORS OF 40 COURSES IN 1990 USING THE FEATURE ANALYSIS MODEL

Level/Course	Group 1		Group 2				Group 3					Group 4		Group 5				Group 6		1990	
	30%		10%				20%					10%		20%				10%			
	Ind 1	Score	Ind 2	Ind 3	Ind 4	Score	Ind 5	Ind 6	Ind 7	Ind 8	Score	Ind 9	Score	Ind 10	Ind 11	Ind 12	Score	Ind 13	Score	Total Score	Rank
ITC																					
Mechanical & Electrical Drafting & Design	5	30.0%	5	4	5	9.3%	2	2	5	2	11.0%	5	10.0%	4	5	5	18.7%	3	6.0%	85.0%	1
Mechanical Engineering	5	30.0%	1	3	5	6.0%	3	2	5	3	13.0%	2	4.0%	3	5	4	16.0%	4	8.0%	77.0%	2
Electrical Engineering	5	30.0%	1	2	3	4.0%	2	1	5	2	10.0%	2	4.0%	3	5	5	17.3%	3	6.0%	71.3%	3
Electronics Engineering	4	24.0%	1	3	4	5.3%	5	4	4	2	15.0%	2	4.0%	2	5	5	16.0%	3	6.0%	70.3%	4
Electro-Mechanical Engineering	4	24.0%	2	2	3	4.7%	4	4	4	2	14.0%	2	4.0%	3*	3*	3*	12.0%	3*	6.0%	64.7%	5
CBS																					
Secretarial Practice	5	30.0%	2	3	5	6.7%	5	3	4	1	13.0%	2	4.0%	3	5	5	17.3%	3	6.0%	77.0%	1
Accounting	5	30.0%	2	3	5	6.7%	4	1	4	2	11.0%	3	6.0%	3	5	5	17.3%	3	6.0%	77.0%	1
NTC-2																					
Civil/Structural Drafting	5	30.0%	5	3	1	6.0%	2	5	5	1	13.0%	5	10.0%	4	5	5	18.7%	3	6.0%	83.7%	1
Architechtural Drafting	5	30.0%	5	3	1	6.0%	3	5	4	2	14.0%	5	10.0%	3	5	5	17.3%	3	6.0%	83.3%	2
Electrical Fitting & Installation	5	30.0%	5	3	1	6.0%	5	2	3	1	11.0%	5	10.0%	3	5	4	16.0%	3	6.0%	79.0%	3
Electro-Mechanical Servicing	4	24.0%	5	3	1	6.0%	4	4	4	2	14.0%	5	10.0%	3	5	5	17.3%	3	6.0%	77.3%	4
Electronics Servicing (Digital)	3	18.0%	5	3	3	7.3%	5	4	4	2	15.0%	5	10.0%	3	5	5	17.3%	3	6.0%	73.7%	5
Motor Vehicle Mechanics	4	24.0%	4	3	5	8.0%	2	2	3	2	9.0%	5	10.0%	3	5	4	16.0%	3	6.0%	73.0%	6
Electrical Power & Machines	5	30.0%	3	3	1	4.7%	2	3	4	2	11.0%	5	10.0%	1	5	2	10.7%	3*	6.0%	72.4%	7
Electronics Servicing (Ec Instru)	3	18.0%	5	3	3	7.3%	2	3	4	3	12.0%	5	10.0%	4	3	5	16.0%	3	6.0%	69.3%	8
Heavy Duty Diesel Mechanics	3	18.0%	5	3	5	8.7%	1	1	2	4	8.0%	5	10.0%	3	4	5	16.0%	3	6.0%	66.7%	9
Electronics Servicing (Video)	3	18.0%	5	3	3	7.3%	2	2	4	1	9.0%	3	6.0%	3	5	5	17.3%	3	6.0%	63.7%	10
Dressmaking	2	12.0%	5	3	1	6.0%	2	3	3	3	11.0%	5	10.0%	3	5	3	14.7%	2	4.0%	57.7%	11
Tool & Die Making (Injection Mould)	2	12.0%	3	3	1	4.7%	1	2	3	3	9.0%	5	10.0%	3	4	5	16.0%	3	6.0%	57.7%	11
Precision Machining	2	12.0%	1	3	1	3.3%	2	2	2	1	7.0%	5	10.0%	3	5	5	17.3%	3	6.0%	55.7%	13
Tool & Die Making (Press Tool)	2	12.0%	2	2	1	3.3%	1	1	2	3	7.0%	5	10.0%	3	5	5	17.3%	3	6.0%	55.7%	13
Maintenance Fitting	1	6.0%	5	4	1	6.7%	1	1	1	4	7.0%	5	10.0%	3	5	5	17.3%	4	8.0%	55.0%	15
Air-Conditioning & Refrigeration Mechanics	1	6.0%	5	3	1	6.0%	1	1	1	1	4.0%	5	10.0%	3	5	5	17.3%	3	6.0%	49.3%	16

RO13/FEATURE1.WK3

Level/Course	Group 1		Group 2				Group 3					Group 4		Group 5				Group 6		1990	
	30%		10%				20%					10%		20%				10%			
	Ind 1	Score	Ind 2	Ind 3	Ind 4	Score	Ind 5	Ind 6	Ind 7	Ind 8	Score	Ind 9	Score	Ind 10	Ind 11	Ind 12	Score	Ind 13	Score	Total Score	Rank
NTC-3																					
Motor Vehicle Mechanics	5	30.0%	5	3	5	8.7%	5	5	5	4	19.0%	5	10.0%	3	5	1	12.0%	3	6.0%	85.7%	1
Air-Conditioning & Refrigeration Mechanics	5	30.0%	5	3	1	6.0%	5	5	5	4	19.0%	5	10.0%	3	5	2	13.3%	3	6.0%	84.3%	2
Metal Machining	5	30.0%	5	3	1	6.0%	5	3	4	4	16.0%	5	10.0%	3	5	3	14.7%	3	6.0%	82.7%	3
Heavy Duty Diesel Mechanics	5	30.0%	5	3	5	8.7%	3	2	4	4	13.0%	3	6.0%	3	5	3	13.3%	3	6.0%	77.0%	4
Building Servicing	5	30.0%	5	3	5	8.7%	1	1	4	4	10.0%	5	10.0%	3	5	1	12.0%	3	6.0%	76.7%	5
Electrical Fitting & Installation	3	18.0%	4	3	1	5.3%	4	3	5	1	13.0%	5	10.0%	3	5	4	16.0%	5	10.0%	72.3%	6
Building Drafting	3	18.0%	5	3	1	6.0%	1	3	5	2	11.0%	5	10.0%	3	3	5	14.7%	3	6.0%	65.7%	7
Maintenance Fitting	3	18.0%	5	3	1	6.0%	4	1	3	4	12.0%	4	8.0%	3	4	3	13.3%	3	6.0%	63.3%	8
Electronics Servicing	2	12.0%	1	3	3	4.7%	4	3	4	2	13.0%	5	10.0%	3	5	3	14.7%	4	8.0%	62.3%	9
Hairdressing	2	12.0%	5	3	1	6.0%	2	4	4	5	15.0%	5	10.0%	3	4	4	14.7%	2	4.0%	61.7%	10
Marine Fitting	3	18.0%	4	3	1	5.3%	1	1	4	4	10.0%	5	10.0%	3	5	1	12.0%	3	6.0%	61.3%	11
Furniture Production	3	18.0%	5	3	1	6.0%	1	2	5	1	9.0%	5	10.0%	3	5	1	12.0%	3	6.0%	61.0%	12
Offset Printing	2	12.0%	5	3	1	6.0%	1	2	5	3	11.0%	2	4.0%	3*	5	5	17.3%	3*	6.0%	56.3%	13
Dressmaking	1	6.0%	5	3	1	6.0%	2	4	4	4	14.0%	5	10.0%	3	5	2	13.3%	3	6.0%	55.3%	14
Graphic Reproduction	1	6.0%	5	3	1	6.0%	1	3	5	2	11.0%	5	10.0%	1	5	4	13.3%	3	6.0%	52.3%	15
General Welding	2	12.0%	5	3	1	6.0%	1	1	4	1	7.0%	4	8.0%	3	4	1	10.7%	3	6.0%	49.7%	16
Upholstery	2	12.0%	5	2	1	5.3%	1	1	2	4	8.0%	5	10.0%	3	4	1	10.7%	1	2.0%	48.0%	17

Indicator 1 – Compatibility of CPTE's projected intake in 1990 with actual number admitted in 1990
2 – Compatibility of output between VITB and other institutions offering similar training
3 – Cost of training per trainee
4 – Trainer – trainee ratio
5 – Number of first choice applicants
6 – Subscription rate
7 – Placement rate
8 – Dropout rate
9 – Pass rate
10 – Time spent to acquire first job by graduates
11 – Employment rate of graduates
12 – Training – related placement rate
13 – Median monthly salaries

* These are artificial scores given at the mid-point of the scale as indicators are not available.

RO13/FEATURE2.WK3

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Annex 15

Employers' Evaluation of VITB Graduates*

Dimension / Feature of Training \ Rating (n=177)	Very Good	Good	Average	Poor	Unable To Say	Not Stated/ Not Applicable	Average Score on Satisfaction
Technical Skills (Only applicable to those graduates who utilize their VITB skills in carrying out their present job)							
1 Theoretical knowledge of work processes	6(3%)	71(40%)	80(45%)	8(5%)	4(2%)	8(5%)	2.4
2 Practical knowledge of equipment, materials and work processes	5(3%)	76(43%)	78(44%)	7(4%)	2(1%)	9(5%)	2.4
3 Actual skill competency	2(1%)	78(44%)	79(45%)	4(2%)	4(2%)	10(6%)	2.5
Communication Skills							
4 Understanding written instructions, eg equipment manuals, job instructions, written orders etc	10(6%)	81(46%)	75(42%)	9(5%)	2(1%)	-	2.5
5 Giving instructions in writing	2(1%)	43(24%)	92(52%)	25(14%)	11(6%)	4(2%)	2.1
6 Understanding oral instructions	8(5%)	105(59%)	59(33%)	5(3%)	-	-	2.6
7 Giving oral instructions	3(2%)	66(37%)	90(51%)	5(3%)	9(5%)	4(2%)	2.4
8 Communicating with their supervisors	6(3%)	80(45%)	85(48%)	3(2%)	2(1%)	1(1%)	2.5
9 Communicating with customers/public	4(2%	47(27%)	80(45%)	11(6%)	21(12%)	14(8%)	2.3
Industrial Safety							
10 Observance of general workplace safety rules	2(1%)	91(51%)	58(33%)	9(5%)	2(1%)	15(8%)	2.5
11 Knowledge and observance of the specific safety rules of their work	1(1%)	89(50%)	64(36%)	4(2%)	4(2%)	15(8%)	2.5

Dimension / Feature of Training \ Rating (n=177)	Very Good	Good	Average	Poor	Unable To Say	Not Stated/ Not Applicable	Average Score on Satisfaction
12 Knowledge of the hazards and observance of the safety measures in the use of equipment/ machinery	2(1%)	84(47%)	66(37%)	5(3%)	6(3%)	14(8%)	2.5
13 Knowledge and observance of the proper procedures for handling and storing of tools and materials	3(2%)	72(41%)	69(39%)	10(6%)	7(4%)	16(9%)	2.4
14 Knowledge of the types and uses of personal protective equipment	3(2%)	76(43%)	65(37%)	4(2%)	9(5%)	20(11%)	2.5
15 Knowledge and observance of good house-keeping in work area	2(1%)	70(40%)	79(45%)	12(7%)	3(2%)	11(6%)	2.4
16 Knowledge and observance of personal hygiene	5(3%)	84(47%)	69(39%)	4(2%)	5(3%)	10(6%)	2.5
Work Attitude/Interpersonal Relationship							
17 Sense of productivity	7(4%)	73(41%)	80(45%)	13(7%)	1(1%)	3(2%)	2.4
18 Quality consciousness	4(2%)	73(41%)	91(51%)	4(2%)	2(1%)	3(2%)	2.4
19 Teamwork (co-operation)	10(6%)	94(53%)	63(36%)	6(3%)	1(1%)	3(2%)	2.6
20 Readiness to accept responsibility	8(5%)	81(46%)	77(44%)	7(4%)	4(2%)	-	2.5
21 Willingness to work overtime	17(10%)	92(52%)	60(34%)	5(3%)	3(2%)	-	2.6
22 Willingness to work shifts	5(3%)	35(20%)	53(30%)	17(10%)	30(17%)	37(21%)	2.2
23 Punctuality	11(6%)	87(49%)	68(38%)	11(6%)	-	-	2.5
24 Work attendance	12(7%)	107(60%)	50(28%)	6(3%)	1(1%)	1(1%)	2.6
25 Pride in work	9(5%)	81(46%)	75(42%)	7(4%)	4(2%)	1(1%)	2.5
26 Courtesy	8(5%)	81(46%)	78(44%)	6(3%)	4(2%)	-	2.5

Dimension / Feature of Training \ Rating (n=177)	Very Good	Good	Average	Poor	Unable To Say	Not Stated/ Not Applicable	Average Score on Satisfaction
General Work Performance							
27 Ability to carry out job functions efficiency	6(3%)	85(48%)	77(44%)	5(3%)	2(1%)	2(1%)	2.5
28 Ability to carry out job functions independently	5(3%)	76(43%)	85(48%)	6(3%)	3(2%)	2(1%)	2.4
29 Ability to organise work	2(1%)	56(32%)	98(55%)	12(7%)	6(3%)	3(2%)	2.3
30 Manual dexterity	3(2%)	56(32%)	94(53%)	4(2%)	6(3%)	14(8%)	2.3

* Refers to the 'selected' group of employees who have completed VITB full-time courses and possess VITB Certificates.

Rating	Ranking
Very good/good	Employer was very satisfied with job performance.
Average	Employer was fairly satisfied with job performance.
Poor	Employer was not satisfied with job performance.

The following weights had been assigned to the ratings:

Rating	Weight Assigned
Very good/good	3.0
Average	2.0
Poor	1.0

The average score on satisfaction was then computed based on the following formula:

$$\sum_{n=1}^{i} n_i w_i \; / \; \sum_{n=1}^{i} n_i$$

where n_1, n_2, and n_3 refer to the number of employers who indicated that they were 'very satisfied', 'fairly satisfied' or 'not satisfied' with the job performance of their VITB employees and w_1, w_2 and w_3 are the weights assigned (3, 2 and 1 points respectively). Those who did not indicate the ratings were excluded in the computation of the statistic. The range of scores was then ranked as follows:

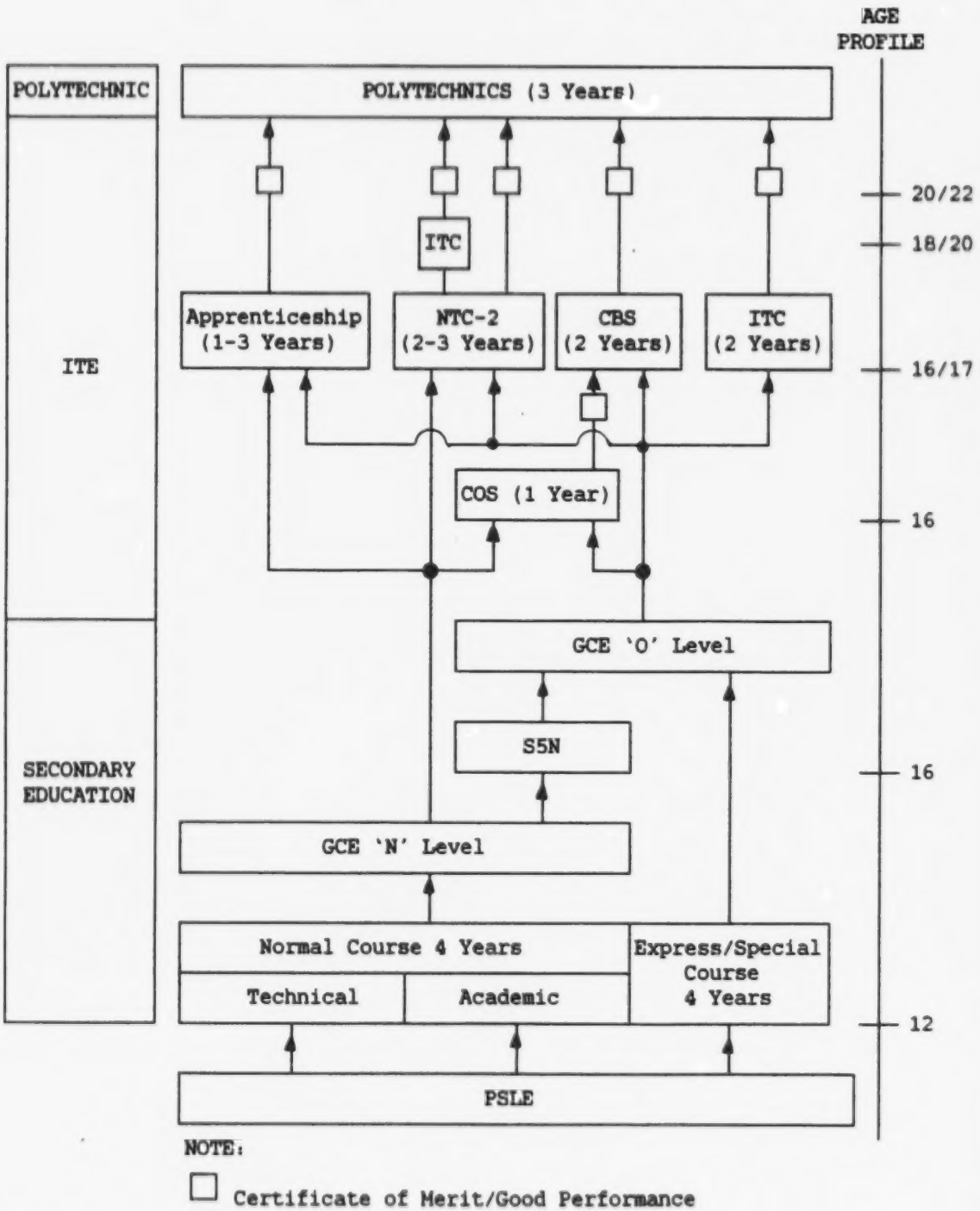
Points	Ranking
2.5 - 3.0	Employers were very satisfied with graduates' performance.
1.6 - 2.4	Employers were fairly satisfied with graduates' performance.
1.0 - 1.5	Employers were not satisfied with graduates' job performance.

TREND PERFORMANCE OF VITB GRADUATES (1985-1990)

Employment Indicator \ Year of Survey	Female						Reservist					
	1985	1986	1987	1988	1989	1990	1985	1986	1987	1988	1989	1990
No of respondents	1218	1426	1446	1454	1964	1764	1093	649	917	550	859	819
No of economically active graduates	1034	1058	1219	1285	1723	1647	977	608	837	509	800	771
No employed	910	906	1073	1193	1630	1576	847	485	712	472	743	727
Employment rate	88%	86%	88%	93%	95%	96%	87%	80%	85%	93%	93%	94%
Average time taken to find first job (months)	1.8	1.7	1.7	1.2	1.2	1.0	1.8	1.9	1.7	1.5	1.4	1.3
Percent in related occupations	86%	75%	70%	82%	82%	80%	71%	57%	59%	68%	69%	64%
Median monthly salary	$484	$451	$450	$477	$530	$600	$619	$586	$558	$600	$661	$750

Annex 16

RESTRUCTURED ITE TRAINING SYSTEM



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